THE IRON TRADE REVIEW

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# Export Demand is Active

## In Machine Tool and Machinery Lines, But Very Little Improvement is Reflected in Iron and Steel Manufacturing Plants

Export demand for American machinery and machine tools continues active. A New York firm has received orders for 1,000 grinding machines for Germany, France and Russia. Very large orders have also been placed for milling machines and automatic screw machines and more orders for lathes have been entered. On account of the improvement in machinery business, some foundries are more active, but there has been no change for the better in general iron and steel manufacturing, which continues at low ebb.

**Pig Iron**

Weakness in the pig iron market continues to be shown in concessions made on even limited tonnages, particularly in the Philadelphia district, where Buffalo iron has been sold on a basis of $12, furnace, for No. 2X. Prices are also unsteady at Pittsburgh.

**Ferro Manganese**

Sales of limited tonnages of ferro-manganese for re-export have aroused much interest. English makers who fear that some of their product may finally find its way to Germany have requested their agents in this country not to sell material for re-export to Europe. Some concessions in prices are being made from the regular quotation of $68, seaboard, and on a sale for delivery in Sweden the price is said to have been $67.25. The domestic market in ferro is very quiet, as consumers are well supplied.

**Finished Material**

Mills in the Pittsburgh district rolling shapes, plates and bars are now operating at only about 40 per cent of capacity and recent specifications have not exceeded 35 per cent. Reports from other parts of the country, although not so definite, indicate that active capacity is not greater than it is in the Pittsburgh district. Many foundries are still operating at from 35 to 50 per cent capacity.

**Plates**

American mills are figuring on 13,000 tons of plates for a riveted water pipe line in Australia with a fair prospect of the business coming to this country. The Carnegie Steel Co. will furnish 14,000 tons for the dreadnought to be built by the New York Ship Building Co., as well as a similar tonnage announced last week for the dreadnought to be built by the Newport News Ship Building Co.

**Bars and Wire**

Some automobile makers, particularly those manufacturing heavy trucks, are very busy, but these companies are not placing additional orders for bars. Lower prices are quoted at Chicago on steel bars and 1 cent a pound has been shaded in that city on iron bars. The wire market continues active and pending inquiries include 20,000 tons of barb wire for delivery to foreign countries. Considerable inquiry is coming from Canada.

**Pipe**

The distribution of 22,000 tons of cast iron segments for the East River subway among three companies brings the total to 95,000 tons. An order for a large tonnage of steel pipe for a gas line at Waco, Tex., has been placed. In some centers, sheet manufacturers are making a more determined effort to maintain prices, but lower quotations are being named at Chicago, and it is probable that an inquiry for any considerable tonnage would develop lower prices in other centers.

# THE OPEN HEARTH

## Let Every Man Do His Part

THE spectacle presented at Washington last week of both branches of congress being prevented for several days from adjourning by a few southern representatives determined to force a $250,000,000 bond issue upon the American people in order to help the cotton growers, who, because of the war, have been unable to dispose of their product, was a fitting climax of the many wild schemes which have been proposed since the war was started. The cotton situation is deplorable and the people of the states where cotton is almost the only agricultural product are entitled to the sympathy and all reasonable help of the country. The present outlook is, that, with such proper aid as the government can give through the Federal Reserve Bank, with the assistance of banks in general and with increased exports, which are assured, the cotton situation will soon be relieved to a very large extent, but in any event the proposition for the government to issue bonds ought not to be adopted.

The people of the cotton producing states are by no means alone in appealing for help, and in asking that it be extended by adopting unsafe and dangerous policies. It has long been conceded that the railroads of the country have been suffering severely from many causes and that their appeal for higher freight rates was worthy of thorough investigation, but the country was hardly prepared to see the railroads putting forth the arguments which recently have been advanced for higher freight rates or for the unique statements made by some bankers. A representative of a New York bankers' association in Washington the other day urged that the carriers be granted a general 5 per cent increase on account of the psychological effect that the change in the attitude of the government toward the railroads would have on foreign investors in railroad securities. He said that the question ought to be settled simply on the bankers' contention that the railroads needed help regardless of the fundamental merits. Raising the rates, he declared, is the greatest thing that can be done to relieve the situation psychologically. Much evidence worthy of careful consideration was presented to the Interstate Commerce Commission at the original hearing in the 5 per cent case, and such talk as that indulged in by the New York banker will hardly improve the chances of the railroads. President Rea of the Pennsylvania system, in answer to questions by the counsel of the Interstate Commerce Commission, admitted last week that there were no conditions outside of those arising from the war different from those which prevailed at the time of the announcement of the decision of the commission in the 5 per cent case. No one could deny the assertion of the attorney for the various steel companies that the great iron and steel industry has suffered severely on account of the war and is operating at considerably less than 50 per cent of capacity, but no company in that industry is thinking of asking the government to do anything for it.

What is needed in this country at the present time, more than anything else, to bring about better conditions, is a determination of every one to stand up and do his part. This country has its troubles, but when compared with the loss of life and property, the suffering, sickness and all the distressing conditions that prevail in the old world, our troubles are small indeed. It is no time to forsake sound doctrines and adopt wild theories. It is no time for Americans to become a nation of leaners. It *is* time for every man to stand erect and do his part patiently, persistently and courageously.

That, we believe, is exactly what a vast majority of the manufacturers in all parts of the country are doing at the present time. Special attention is being given to the question of unemployment. Some industries are working much more nearly to full capacity than others, and in order to prevent increasing idleness, many readjustments will be necessary. By reducing hours of labor rather than by discharging employes, manufacturers are giving as many men as possible employment. With money conditions improving, fair increase in activity may be expected in many industries, and with hearty co-operation of employers and employes, hardships of the winter will be greatly reduced.

# THE OPEN HEARTH

## Commercial War and Wars of Nations

THE sentiments expressed on various important topics at the meeting of the National Machine Tool Builders' Association in New York last week were worthy of the high grade of men who compose this association. Naturally, much of the discussion related directly or indirectly to conditions growing out of the war, but there was not a trace of anything ignoble in the deliberations. On the contrary, there was a heart-felt expression of sympathy for all of the European nations at war and the earnest hope was expressed that the good offices of the United States finally may succeed in establishing peace. President Viall of the association, in referring to the heavy orders from warring countries, said:

"At a time like this, we are especially impressed with the fact that our industry is a most important one when we realize the part that it plays in the preparation of arms and projectiles. Its position, however, in the arts of peace, is a still more important one, as peace has been for the last forty years and we hope it will be for all time to come, the normal condition of the world and as participants in this industry, we have a right to feel pride in it that will incite us to still greater efforts to keep it as clean an industry as it is today."

The machine tool builders are indeed building on solid foundations, not for today, or tomorrow, or for any unusual period, but for all time.

There is reason for hoping that one result of the war will be the establishment of international business on a better basis. One of the conditions that made it easy for the European nations to go to war was the feeling on the part of some of them that others had been ruthless in their commercial methods. There is evidence that in European business affairs there was the same determination to win regardless of the rights of others that has since been disclosed in bloody warfare. In times of peace, there was much of the conscienceless strife that has characterized the activities of the armies during the past three months. Americans, especially machine tool builders, have been victims of the outrageous disregard of the rights of others by some European competitors. Is it too much to hope that, as the world awakens to an appreciation of the frightful destructiveness of war, it will demand that it shall be no more and that also there shall be stricter adherence to rules of fair dealing in times of peace?

## Supervising Morals

MANY interesting stories are being told nowadays about the experiences of the Ford Motor Co. at Detroit in working out the bonus plan of that company. One of the stories recently published relates to an employe who "thought he had a mother somewhere". He inquired why he was not receiving as much compensation as some of the other employes. He was given to understand that if he would hunt up his mother and support her, he would be more liberally paid for his work. He accordingly did this and now the mother and son are living happily together and the son is receiving higher wages.

This is very nice and unquestionably there ought to be closer personal contact of employers or their agents and employes. No one can deny that labor troubles would be more easily adjusted if the old time close relations of employers and employes existed today. When, however, a company undertakes to inquire into the personal habits of employes and has its agents act as detectives, it is taking a radical departure. Possibly espionage might be resented by employes and more ill feeling result than if no supervision of morals had been undertaken. The success of any plan of supervision will depend largely on whether the employes believe that the company is absolutely sincere and fair. Those who know Mr. Ford say there can be no question as to his honesty of purpose and his deep sympathy for his employes. If the employes hold this belief and the work of the investigating agents is tactfully done, great good may result.

## Prices Present and Past

*Quotations on leading products today, average for last month, average for three months ago and average for October, 1913. Prices are those ruling in the largest percentage of sales at the dates named.*

| | Today's prices. | Average for Sept., 1914. | Average for July, 1914. | Average for Oct., 1913. |
|---|---|---|---|---|
| Bessemer pig iron, Pittsburgh.. | $14.65 | $14.90 | $14.90 | $16.60 |
| Basic pig iron, Pittsburgh..... | 13.40 | 13.90 | 13.90 | 14.85 |
| No. 2 Fdy. pig iron, Pittsburgh | 13.65 | 13.90 | 13.90 | 14.80 |
| Northern No. 2 Fdy., Chgo.... | 13.00 | 13.50 | 14.00 | 15.00 |
| Lake Superior Charcoal, Chgo.. | 16.00 | 15.75 | 15.75 | 15.75 |
| Malleable, Bessemer, Chicago... | 13.00 | 13.50 | 14.00 | 15.00 |
| Southern No. 2 Birmingham.... | 10.00 | 10.00 | 10.13 | 11.00 |
| Southern Ohio No. 2, Ironton.. | 13.00 | 13.00 | 13.50 | 14.00 |
| Basic, eastern Pa..... | 14.00 | 14.00 | 14.00 | 15.25 |
| No. 2X Virginia furnace..... | 12.50 | 12.50 | 12.50 | 13.00 |
| No. 2X Foundry, Philadelphia.. | 14.50 | 14.75 | 14.75 | 15.75 |
| Ferro mang., Balti..... | 67.50 | 90.00 | 37.50 | 50.00 |
| Billets, Pbgh. ..... | 20.00 | 21.00 | 20.00 | 23.00 |
| Billets, Ygn. ..... | 19.50 | 21.00 | 20.00 | 23.00 |
| Sheet bars, Pbgh..... | 21.00 | 22.00 | 21.00 | 23.80 |
| Steel bars, Chicago..... | 1.28 | 1.38 | 1.28 | 1.53 |
| Sheet bars, Ygn..... | 20.00 | 22.00 | 21.00 | 23.80 |
| Steel bars, Pittsburgh..... | 1.15 | 1.20 | 1.15 | 1.40 |
| Iron bars, Philadelphia..... | 1.20 | 1.25 | 1.20 | 1.37 |
| Iron bars, Cleveland, local del'y. | 1.20 | 1.20 | 1.20 | 1.37 |

| | Today's prices. | Average for Sept., 1914. | Average for July, 1914. | Average for Oct., 1913. |
|---|---|---|---|---|
| Iron bars, Chgo. mill..... | 1.00 | 1.07 | 1.05 | 1.25 |
| Beams, Chicago ..... | $1.28 | $1.38 | $1.28 | $1.58 |
| Beams, Pittsburgh ..... | 1.15 | 1.20 | 1.15 | 1.37 |
| Beams, Philadelphia ..... | 1.30 | 1.30 | 1.25 | 1.45 |
| Tank plates, Pittsburgh..... | 1.15 | 1.18½ | 1.12½ | 1.34 |
| Tank plates, Chicago..... | 1.28 | 1.38 | 1.28 | 1.53 |
| Tank plates, Philadelphia..... | 1.30 | 1.30 | 1.25 | 1.55 |
| Sheets, blk., No. 28, Pittsburgh. | 1.95 | 1.95 | 1.87 | 2.02 |
| Sheets, blue an., No. 10, Pbgh. | 1.40 | 1.40 | 1.37 | 1.56 |
| Sheets, galv., No. 28, Pbgh..... | 2.95 | 2.95 | 2.80 | 3.07 |
| Wire nails, Pittsburgh..... | 1.60 | 1.55 | 1.57 | 1.62 |
| Connellsville fur. coke., contr... | 1.65 | 1.75 | 2.00 | 2.15 |
| Connellsville fdy. coke contr... | 2.25 | 2.25 | 2.40 | 2.81 |
| Heavy melting steel, Pbgh..... | 10.25 | 11.44 | 12.00 | 12.25 |
| Heavy melting steel, east'n Pa.. | 9.50 | 11.00 | 10.50 | 11.00 |
| Heavy melting steel, Chgo..... | 8.50 | 9.37 | 9.50 | 10.50 |
| No. 1 wrought, eastern Pa..... | 11.50 | 12.50 | 12.00 | 14.25 |
| No. 1 wrought, Chgo..... | 7.50 | 8.31 | 9.00 | 9.75 |
| Rerolling rails, Chgo..... | 10.00 | 10.87 | 11.25 | 12.00 |
| Car wheels, Chgo..... | 10.00 | 10.75 | 11.00 | 12.50 |

(For Additional Prices See Page 840.)

# Sharp Competition in Pig Market

### Develops Lower Prices in Eastern Territory, Where Buffalo and Western Pennsylvania Furnaces Actively Seek Business—Dull in Nearly All Centers

Philadelphia, Oct. 24.—Spirited competition among makers has developed in this district and lower prices are coming out upon even the very small lots which make up the current market. Both Buffalo and western Pennsylvania irons have invaded this territory and have complicated the already strenuous manner in which the nearby furnaces have been pursuing business, recently. Small sales of Buffalo No. 2X at $14.45, delivered, equivalent to $12, furnace, are noted both in this city and at Pottstown, Pa. A lot of 100 tons of No. 3 from a western Pennsylvania maker was taken by a consumer in this city at $14, delivered, or about $11.75, at the furnace. Some eastern Pennsylvania makers have been quoting $14.50, Philadelphia basis, for No. 2X, as previously reported and the indications are they might do less if the circumstances demanded it. It develops that a Delaware river pipe maker took 2,000 tons of Alabama No. 3 for early delivery at about $13.75, delivered. This transaction was referred to recently. The Southern Railway has closed for 575 tons of Alabama foundry largely for Lenoir City, Tenn. Sales of 1,500 to 2,000 tons of Virginia special analysis iron including one lot of about 1,000 tons have been made in this district. On regular grades of Virginia, $12.50 to $12.75 for No. 2X is openly quoted, but it is understood $12.25 might be done under certain conditions. Low phosphorus iron also is weaker. Standard metal is quotably 50 cents lower at $20.50 to $21, Philadelphia basis, and Lebanon grades at $16, furnace. The latter figure is reported to have been shaded considerably in one case. The Delaware river furnace at Chester has entered the market as a new seller of low phosphorus and is credited with having closed some tonnage. The market for this grade is not active, but a western New Jersey steel maker is reported to have taken 1,000 tons. Another New Jersey steel maker is inquiring for a small lot and an inquiry for 500 to 1,000 tons for a Milwaukee buyer which already has placed some iron in the east, is being figured. Eastern steel works continue to hold up shipments of basic, in some cases taking only about 50 per cent of their quotas. As a consequence, there is no demand and the $14, delivered price, now quoted is altogether nominal.

#### Weak in New York

New York, Oct. 27.—Miscellaneous buying of pig iron continues to be done in the metropolitan and surrounding districts and it demonstrates a weak condition of the market. In most cases lots taken have been small, though in a few instances 1,000 tons have figured, and in the aggregate have totaled probably 5,000 tons. A considerable portion of this business has been done quietly on offers by consumers solicited by the furnaces. Some of the iron sold, especially that by Buffalo producers, who have continued to be aggressive factors, has run through the first quarter and first half, but sellers show no desire to push the next year's market at this time. These sales for delivery after Jan. 1 have been done at some advance over the prices quoted by Buffalo makers for this year's shipment, which follow the range of $12 to $12.25, furnace, for No. 2X. At tidewater, the ruling prices at this time are from $14 to $14.25 for No. 2X. A Bristol, Conn., consumer was the buyer of some lots of charcoal and foundry. One inquiry for 500 tons of spot No. 2 plain from a local buyer is current and several small quantities openly are being negotiated. A Harrison, N. J., steel maker is in the market for a small lot of low phosphorus. The Empire Steel & Iron Co., Catasauqua, Pa., will furnish the pig iron requirements for the 11,000 tons of cast iron segments for East river tubes taken by the Davies & Thomas Foundry Co., Catasauqua,

(*For complete prices see page* 840.)

Pa. The requirements for the additional tonnage of the segments taken by the New York Car Wheel Co. are expected to come from Buffalo. It has been decided finally by the operators not to blow in the Port Henry, N. Y., furnace and the present organization will be disbanded Nov. 1. It is learned that the supplemental all-rail freight rate on Virginia iron to Boston common points in New England, which will go into effect Nov. 10, will apply only to points taking the New York, New Haven & Hartford railroad delivery. The New England rate situation on Virginia iron, therefore, still will be left in a complicated condition.

### Buffalo Sales 4,500 Tons

Buffalo, Oct. 27.—Sales for the week totaled about 4,500 tons of all grades. This was made up of moderate sized lots to Buffalo district melters and the rest to consumers outside of the district. The market continues featureless. The slight improvement in sales is the only thing noted. Even though the furnace interests say that schedules are being quoted for iron at figures below production cost, the interest of buyers has not been aroused to any extent. There seems to be little in view upon which to base a hope at this time for an improvement in the situation.

Some of the interests report a moderate improvement in the machinery trade. Prices remain the same as quoted a week ago.

### Steel-Making Irons Decline

Pittsburgh, Oct. 27.—Steel-making grades of pig iron continue to show signs of weakness, and prices appear about 25 cents a ton lower than a week ago, when basic was listed at $12.75 and Bessemer at $14, valley. The nominal price of Bessemer pig iron had been $14, valley, for the last half year. Foundry grades show signs of softness, but prices have not been severely tested. The Wheeling Mold & Foundry Co., Wheeling, has not yet closed for the pig iron involved in its recent order for about 5,500 tons of cast iron segments for New York tube work. The company has taken approximately 50,000 tons of this work, having received an order for between 35,000 and 40,000 tons some time ago. The Carnegie Steel Co. is operating 26 of its 58 blast furnaces in this district, having blown out one Isabella stack last week; all three furnaces at the Isabella plant now are idle. The A. M. Byers Co. probably will blow out its furnace at Girard, O., this week, which will leave only five active merchant stacks in the valleys, out of a total of 18, including two Brier Hill Steel Co. furnaces, which are regarded as non-merchant furnaces by many.

### Shipments Slow

Cleveland, Oct. 27.—In the Cleveland district, it is the same old story of inactivity in the pig iron market. Shipments from furnaces to foundries are being made very slowly owing to many requests for postponement and it is evident that large tonnages sold for delivery this year will be carried over into next year.

### Pig Iron Continues Dull

Chicago, Oct. 27.—A slightly better inquiry continues and some sales are being made, although for the most part they are for small tonnages and immediate delivery. Pig iron makers have reduced their operating capacity almost to the minimum and are of the opinion that no better conditions will prevail during this year. Comparatively small inquiry is being received for first quarter or first half and for the most part makers are unwilling to quote until the tendency of the market is more clearly defined. One interest, which is not producing at present, has practically retired from the market for present quarter with a quotation of $14, Chicago furnace, on its No. 2 foundry and malleable.

A local foundry turning out ornamental iron recently closed for 1,000 tons equally divided between northern and southern for delivery during the present quarter. A Racine melter has taken 200 tons of 8 per cent silveries at the prevailing quotation. A Wisconsin maker of pumps and engines has closed on an inquiry of 300 tons of No. 2 foundry for delivery during first quarter, the price not being disclosed. An inquiry from a Beloit, Wis., melter mentioned last week has not been closed.

Southern iron continues to be quoted at $10 to $10.25, Birmingham, but sales are few and this market is unusually dull.

### Melt Decreasing

Cincinnati, Oct. 27.—A local melter is in the market for 500 tons of foundry iron for shipment to extend through the last quarter and into the first half. This is the only inquiry of importance before the market and it is expected that it will be closed before the end of the week. The market remains very quiet and featureless with orders limited to small and scattered lots of but a few hundred tons each. A few foundries in this territory are now operating at full capacities because of recent orders from machine tool builders, but they will not need any iron for some time, as they are well supplied on old orders. The melt in this territory is decreasing because rolling mills are operating far below capacities and only a few foundries have been recipients of these orders from machine tool makers. Buyers are offering to contract for the first quarter at present prices, but furnaces have refused to concede this and as yet no business has been done for that delivery. Southern No. 2 foundry iron is mostly on a basis of $10, Birmingham basis, for the last quarter, although a few furnaces are still holding at $10.25, Birmingham basis. Iron at the lower figure can be had in either Alabama or Tennessee. Southern Ohio No. 2 foundry or malleable is stationary at $13, Ironton basis, for the last quarter.

### Slight Improvement

St. Louis, Oct. 26.—While not very marked, the pig iron situation at St. Louis has improved somewhat with an inquiry out today for 200 tons of northern iron and a sale reported last week of 300 tons of 8 per cent silicon and 200 tons of southern No. 2. Southern No. 2 is quoted at $10, $10.25 and $10.50, Birmingham basis, but there would be no difficulty in obtaining the low figure. Northern iron is offered at St. Louis at $14, Chicago, and $13.50, Ironton.

### Uncertainty in South

Birmingham, Ala., Oct. 26.—Small sales ranging from 100 to 500 or 600 tons each were made during the week, but general pig iron market conditions remain the same. All orders were for $10, No. 2 foundry, it is said. Quotations on No. 2 foundry, Birmingham, still range from $10 to $10.25, but all the iron any buyer would want can easily be bought for $10, on immediate delivery or shipment through the remainder of the quarter. No 1915 inquiry has yet developed in the Birmingham district.

"One of the principal things wrong with the pig iron market now," said a well-known iron maker, "is the mystery or rather uncertainty that surrounds everything. Neither the maker nor the buyer knows what to expect. Both are 'on the fence', so to speak. And consequently, while they are waiting for something to happen or some signs of what is going to happen, there is no business."

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Charles M. Schwab, chairman of the Bethlehem Steel Corporation, sailed for Glasgow on Oct. 21, on the Olympic. While Mr. Schwab characterized the present condition of the steel industry as being of unprecedented dullness, he was hopeful for an early improvement.

(*For complete prices see page* 840.)

# Interesting Ferro Sales

## Made for Re-export—Speculation as to Cause of Foreign Nations Ruling Supplies in the United States

New York, Oct. 27.—Inquiry for ferro-manganese recently circulated in this country by neutral nations has resulted in some re-export sales of English metal being made. A lot of 200 tons has been sold at Philadelphia to a steel works in Australia, the material being furnished by an eastern steel company from surplus stock. The price is reported to have been $70, seaboard, the purchaser preferring to pay such a figure for material ready for shipment in this country, rather than to await a new lot to come from England, which he was offered by a merchant at $67.50, New York. Sweden, which has put out a number of different inquiries recently, one of which was for 1,000 tons, also has purchased several hundred tons of re-sale material on hand at eastern points. At least a part of this business is understood to have been done at $67.25, seaboard, though it is known representatives of the buyers were willing to pay direct agents of English makers $68, seaboard, for spot metal, and were offering to pay in cash. The representatives of the English makers in this country have been requested by their principals not to make any sales for re-export to Europe, the inference being that it was feared such material ultimately might be destined for Germany. Italy also has been a prospective purchaser in this country, having asked for 400 tons or more.

The reasons impelling Sweden, Italy and other European countries to come to the United States for ferro-manganese when shipments from England probably are available continue to excite speculation. The common belief among the trade is that this material eventually is intended for one of the countries at war, probably Germany. That Australia should be a buyer here is explained on the assumption that it has been quoted a higher price direct from England than that at which English material now is offered to this country.

The prices quoted on the recent foreign inquiries show that re-sale ferro-manganese at least now may be had under the official English makers' price of $68, seaboard. There continues, however, at the moment, practically no demand from domestic consumers. The latter still are accumulating stocks as shipments against contracts come forward from England and some large steel companies now have enough tonnage on hand to run them well into next year. Sellers, in fact, find difficulty in distributing all the product they are receiving, so liberal have been the shipments in proportion to the present rate of consumption in the steel industry. Certain English sellers who had asked $15 a ton extra on contract shipments to Nov. 1, to cover war risks, etc., now have notified their customers that this premium will not be enforced on November and December deliveries.

The Carnegie Steel Co., it is learned, was the loser of two cargoes of manganese ore, probably 5,000 tons weekly, en route from India, as the result of the recent operations of the German cruiser Emden. The vessels carrying this mineral were among those recently sunk by the warship in the far east. Comment by ore merchants abroad upon the recent embargoing of Indian manganese ore to this country expresses the opinion that a continuation of this prohibition will insure England a good supply of new material, but eventually will mean dearer ferro-manganese in the United States. An effort is being made to obtain the release of three cargoes of this ore consigned to the United States upon the ground that these cargoes were chartered before the embargo was imposed.

### Dunbar Makes 40 Per Cent Ferro

Pittsburgh, Oct. 27.—The Dunbar stack of the American Manganese Mfg. Co., at Dunbar, Pa., which blew in on high manganese iron two weeks ago, started to make 40 per cent ferro-manganese, Oct. 26, from ores obtained in Crow county, Minn. Details are given elsewhere in this issue of THE IRON TRADE REVIEW. The market for ferro-manganese and other alloys is stagnant.

# France is Now Added

## To Countries Inquiring for Semi-Finished Steel—Dickering on Prices Continues

Philadelphia, Oct. 26.—France has joined those foreign countries which recently have been inquiring of eastern Pennsylvania mills for semi-finished steel. That country put out some inquiries for billets during the past week. Quotations now are outstanding on lots for England, Scotland, France, Portugal, Italy and other countries. For England some round tonnages of billets just have been bid upon and action upon these still is awaited. A Pittsburgh merchant has placed before eastern mills a miscellaneous list of billets, sheet bars, skelp and other products for export, the whole aggregating a good tonnage, but this is regarded more as an effort to uncover prices than a bona fide prospect. The fact still remains that eastern makers have been unable to secure business of any importance from the numerous export inquiries for semi-finished steel because they have not named the prices demanded by the buyers. It is stated, however, that not only the mills now are reducing their previous quotations but the buyers also are increasing their bids somewhat and that the prospect ultimately for putting through sales is more promising. Domestic consumers still stay out of the billet market in this district, as to any important business, for Philadelphia delivery. Eastern makers quote billets at $22.40 or $20, Pittsburgh, but this figure probably could be shaded.

### Unchanged at Ashland

Ashland, Ky., Oct. 26.—Wire rods continue at $26 and billets at $21, both Ashland basis. Business booked during the past week has been unsatisfactory, but was equal to that of any previous week during the last two months. Orders are mostly for small tonnages and no important lots have been contracted for.

### Steel for Export

Birmingham, Ala., Oct. 27.—One order of 20,000 tons of steel billets has been reported received by the Gulf States Steel Co. for export. No inquiry has been received here yet, according to furnace men, for any part of the 50,000-ton pig iron order reported in THE IRON TRADE REVIEW as pending from the Japanese government.

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The Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, has received an order for 15 cast steel valves from the Anglo-Mexican Oil Co., for shipment to Mexico. The order was placed with the New York office of the Valve, Foundry & Construction Co.

(*For complete prices see page* 840.)

# Plates for Australia

## And Other Foreign Lands Being Figured On—Carnegie Steel Co. Books Plates for Another Dreadnought

Philadelphia, Oct. 26.—Plate makers in the east and in other districts are bidding actively upon a lot of 13,000 tons of large-size plates for a riveted water line at Coalgardie, Australia, and considerable hopes are entertained that the business may come to this country. Eastern mills, several years ago, furnished some round lots of plates for similar construction in the same territory. Other new export inquiries for plates are appearing, one calling for about 1,000 tons for a gas holder in England. Domestic business continues poor.

Absence of any considerable railroad buying keeps new tonnage and eastern mill operations at a severely low point. The Pennsylvania railroad recently placed an order for 1,000 tons of miscellaneous plates for Altoona. It now is definitely settled that the Carnegie Steel Co. will furnish the approximately 14,000 tons, largely plates, for the dreadnought to be built by the New York Shipbuilding Co. The steel for the other battleship to be constructed at Newport News also has gone to this producer, as previously stated. Reports of low prices wherever large lots of plates have figured, are heard. The tonnage recently placed by a Baltimore builder of gas holders, previously referred to, is said to have gone considerably below 1.10c, Pittsburgh basis, though it is not certain the material will come from that district. The open price on ordinary lots remains 1.30c, Philadelphia, or 1.15c, Pittsburgh.

### Operations Sag to 40 Per Cent

Pittsburgh, Oct. 27.—Mills rolling plates, shapes and steel bars in this district are not operating at more than 40 per cent of capacity, and there is no indication of any immediate change in the situation, although mill managers express the opinion the market now is scraping bottom. Specifications the last 10 days have involved not more than 35 per cent of average capacity. Prices have not been severely tested in this district, where hot rolled products are being held at 1.15c. Reports of shading are heard in adjacent territory. Iron bars are dull and inactive, and the 1.20c price probably could be shaded.

### Prices Untested

Cleveland, Oct. 27.—The plate market in the Cleveland district is dull, the usual quotation is 1.10c to 1.15c, Pittsburgh. There is not enough business going to test prices.

### Mills Not Busy

Cincinnati, Oct. 26.—Plates are still being sold at 1.30c, Cincinnati basis, although a few mills are not accepting business below 1.35c, Cincinnati. Mills have booked very few orders during the past week and the feeling in the market is not optimistic. Mills are not operating at above 50 per cent of capacities.

### Plates Remain Weak

Chicago, Oct. 27.—Entire absence of car buying has made the plate market about as dull as could be imagined and quotations on plates have been weakened to a basis of 1.28c, Chicago. The principal demand is for boiler work and a small percentage for railroad construction.

# Furnace Coke

## Sold to Eastern Pennsylvania Furnace —Production Decreased

Pittsburgh, Oct. 27.—Details of a sale of a small tonnage of blast furnace coke to an eastern Pennsylvania consumer at $1.75, ovens, for the remainder of the year, have encouraged coke operators and sellers. The market, however, continues to border on stagnation, and indications are that additional ovens will be blown out at an early date. Foundry grades are selling at rather wide ranges in price. According to the *Connellsville Courier*, production for the week ending Oct. 22 was 237,729 tons, a decrease of 8,381 tons, compared with the week before. Production will drop to 225,000 tons a week before the end of the month, the *Courier* predicts.

### St. Louis Inquiry

St. Louis, Oct. 26.—The sluggishness that has prevailed in the coke market at St. Louis has been broken by an inquiry for 2,000 tons. Connellsville and Virginia foundry grades are offered at $2.50, ovens.

### Demand Low

Cincinnati, Oct. 27.—Coke continues at a standstill. A few foundries in this territory are now operating at full capacities because of recent orders received from machine tool builders, but they have either contracted for supplies up until next July or their stocks already on hand will run them for several months. No furnaces in this territory are in need of coke. Prices are unchanged and show a strong tendency to remain stationary.

(*For complete prices see page* 840.)

# Pipe Segments

## For East River Tubes Make a Total of 95,000 Tons

New York, Oct. 27.—Distribution the past week of 22,000 tons additional of cast iron pipe tunnel segments for East River subway railroad tubes makes a grand total of 95,000 tons of such castings recently placed in this city. The latest award gives 11,000 tons to the Davies & Thomas Foundry Co., Catasauqua, Pa., and 5,500 tons each to the Wheeling Mold & Foundry Co., Wheeling, W. Va., and to the New York Car Wheel Co., Buffalo. On letting of the first lot of about 72,000 tons some weeks ago, the latter two companies divided the business. The cast iron pipe market in this district remains dull. Very little inquiry now is pending, and this usually is of small character. Prices are weak and $20 to $20.50, New York, for 6-inch pipe represents the present range. An inquiry for 4,000 tons of pipe for Guayaquil, Ecuador, upon which American foundries bid, has been placed with a Glasgow maker.

### No Strength at Chicago

Chicago, Oct. 27.—Last week was almost devoid of business in the cast iron pipe market. No lettings of importance took place and practically the only tonnage contracted was routine business and small orders on which there was no competition. The absence of "hurry up" requests from those anxious to complete pipe laying before frost continues to be a feature and municipalities and public service corporations apparently have nearly completed their work for the season. Two small lettings are in prospect for this week, Ashton, Ill., being about to open bids on 175 tons, and Hammond, Ind., on 50 tons.

# Magnesite Shipments Resumed

Chicago, Oct. 27.—Shipments of dead burned magnesite from Austria have been resumed, the first cargo, of 6,000 tons, coming by the steamer Guiseppe G., of the Italian line, being due in Philadelphia about Nov. 1. This announcement is of importance to the steel trade, as the interruption of shipments has been a matter of no small concern. This shipment is from the Austrian plant of the American Refractories Co.

## Steel Bars

### In Limited Demand—Prices at Chicago Lower

Chicago, Oct. 27.—The market for steel bars in Chicago has gone to a lower level and 1.28c, Chicago mill, is being quoted openly by some leading makers, while others are holding to 1.33c, Chicago, and claim to be booking a small tonnage. For immediate delivery in Chicago and vicinity, 1.25c can be done on moderately attractive business, but there is so little inquiry that no incentive is offered to go lower than these prices. The bulk of such business as is being taken seems to be on a basis of 1.28c.

### Small Business at Philadelphia

Philadelphia, Oct. 26.—New business in steel bars in this district is running light and specifications also continue to fall behind. An inquiry for 140 tons of re-enforcing bars for Baltimore is current. The 450 tons of rounds for export, which, it develops, are for delivery to England, remain unacted upon. Prices, as far as tested under present market conditions, continue at 1.30c, Philadelphia, or 1.15c, Pittsburgh, for the rest of the year. Shafting is slow in this territory and is not firm.

### Looking Into Next Year

Buffalo, Oct. 27.—A few buyers are beginning to sound the market for quotations on contracts extending into next year for bars, shapes, plates, etc. While mills heretofore discouraged inquiry for extended deliveries, on the present market quotations, there seems to be a disposition on the part of the selling interests to enter into negotiations regarding the contemplated tonnages. The mills and agencies of the district are holding to 1.20c, base, but it is believed that where attractive tonnages and deliveries are offered a price of 1.15c may be obtained on most of the commodities in the lines.

Inquiry as a whole continues light and specifications seem to keep on coming in in moderate volume.

### Bar Iron is Lifeless

Chicago, Oct. 27.—Although the market for iron bars in Chicago is represented by a quotation of 1c to 1.05c, quotations have been made in specific instances at a lower price.

An inquiry for 600 tons of iron bars brought out a quotation of 0.95c for immediate acceptance, but the buyer is understood not to have taken the offer. Inquiry and specifications on orders are extremely small and mills are operating from hand to mouth with a constantly dwindling backlog which makes early curtailment of operations seem inevitable.

### Some Plants Busy

Cleveland, Oct. 27.—Some automobile manufacturers are very busy and companies making forgings and other materials for automobiles are also enjoying large business, but there is no buying of bars and the market is extremely dull. It is not believed, however, that 1.15c, Pittsburgh, has been shaded on steel bars.

### Hoops, Bands, Shafting

Pittsburgh, Oct. 27.—The market for hoops, bands and cold rolled shafting borders on stagnation. Specifications against contracts are light and prices have not been tested. No new inquiry is reported.

## Sheet Prices

### More Firmly Held by Some Mills—Demand is Light

Pittsburgh, Oct. 27.—A moderate improvement in specifications last week is reported by a few steel sheet manufacturers; this is about the only encouraging report heard in the district. More important mills are holding material at maximum prices, but eagerness to take additional tonnage apparently has caused some mill managers to offer concessions. There has not been enough new selling at any figure, however, to offer much insight.

### Sheets at Lower Level

Chicago, Oct. 27.—Steel sheets are now undeniably obtainable on a basis of 2.03c to 2.08c and 3.03c to 3.08c, Chicago mill, for No. 28 gage black and galvanized, respectively. Instances are rumored of quotations being made at 50c per ton lower than these prices. Although sheet mills in this territory have had a comfortable backlog that insured operations for several weeks, this is becoming less week by week and dealers are willing to take somewhat less for delivery during the present quarter in order to keep their mills running. The day seems to be approaching when operations will be shortened considerably and those fortunately situated on the market are postponing this as far as possible.

### Somewhat Firmer

Cleveland, Oct. 27.—The sheet market in this district seems to be somewhat stronger. The usual quotations are 2c on No. 28 black, 2.90c on No. 28 galvanized and 1.50c on No. 2 blue annealed, but very little, if any, business is done at these figures, and it is generally believed that good orders could be placed at considerably less.

### Prices Firm at Cincinnati

Cincinnati, Oct. 26.—Sheet prices show no tendency to decline, although orders during the past week have been light. The Newport Rolling Mill Co., Newport, Ky., is still closed, but is shipping direct on old and new orders from its stock. The advance in spelter and the large foreign demand for this material have made it impossible to make galvanized sheets at a lower cost, which is one reason why prices are so strong in this district. Black sheets No. 28 gage are quoted at 2.15c, galvanized sheets No. 28 gage at 3.15c and blue annealed No. 10 gage at 1.60c, all Cincinnati basis.

### Few Orders in East

Philadelphia, Oct. 26.—The falling off in new business with eastern sheet makers has continued. The nicely-balanced order books which were built up by recent buying, now are being cut into steadily. Eastern Pennsylvania makers have not hesitated to quote close where conditions of competition have made it necessary, but as a rule they have been maintaining a spread of 1.55c to 1.60c, Philadelphia, or 1.40c to 1.45c, Pittsburgh, for No. 10 gage blue annealed.

## Wire Market

### Is Active—Foreign Inquiry for a Large Tonnage

Pittsburgh, Oct. 27.—The wire market continues to stand up well as a result of heavy demand created by the European war. One inquiry for foreign shipment involves 20,000 tons of barbed wire. Foreign buyers, convinced that American mills are unable to promise immediate shipment, now are buying for late November and December delivery. Prices are reported to be satisfactory. The domestic situation is comparatively dull.

### Inquiry From Canada

Buffalo, Oct. 27.—Canadian interests have crossed the border with a considerable demand for barbed wire, apparently for export to meet the increased European demand. The Canadian output has been exhausted to meet this demand and the overflow is seeking placement here. In one instance, a large Canadian mill has offered to sublet a contract for 500 tons of barbed wire at an advance of $1 a ton over the mill's schedule price. This offer was made when it was found that the American producers were practically filled over the remainder of 1914.

(*For complete prices see page* 840.)

# Scrap Dull and Low

## Buyers in the East Buy Small Tonnages at Remarkably Low Prices—Little Demand in Any Part of the Country

Philadelphia, Oct. 26.—Buyers among eastern Pennsylvania steel works state that they have not seen the scrap market so dull and weak, as at present, in 20 years. These buyers report they have been able to pick up some sales of No. 1 heavy melting steel, where the sellers were obliged to make sacrifices, at $9, delivered, and even less. It is explained that no large tonnage could be obtained at such figures and that the more normal market on steel is $9.50, delivered, eastern Pennsylvania. It is a fact, however, that, despite the unusually attractive prices, the steel works are showing small inclination because of poor trade, to take on tonnages and they are taking practically only those lots which are being forced into the market. Other grades than steel are lower. There is some demand for turnings from steel works at $8, delivered. The top of wrought pipe now is $9.75, delivered, with further reduction indicated. Offers of $13.80, delivered have been made for steel axles. Foreign scrap now is figuring in this market. One block of 5,000 to 6,000 tons of the several cargoes of Panama scrap arranged to come here, has arrived at Philadelphia. It consists of steel, wrought and malleable grades. A sale of 500 tons of steel from Cuba was put through recently.

### Buffalo Market Sags

Buffalo, Oct. 27.—The dealers of the Buffalo district report a softening in price in practically all of the lines. The market is even more depressed than it was a week ago. The sag has been principally noted in the following lines: Heavy melting steel has dropped to $9 to $9.50; car wheels to $10 to $10.50; machine shop turnings to $5.25 to $5.75; cast iron borings to $5.75 to $6.25; locomotive grate bars to $8.50 to $9; stove plate (net tons) to the same figure; No. 1 busheling scrap to $7.25 to $7.75.

### Declining Rapidly

Pittsburgh, Oct. 27.—Heavy melting steel has dropped to the lowest level recorded in many years in this district. A small tonnage, several days ago, sold at $10, delivered, and numerous lots have sold at $10.25. Some dealers are refusing to sell at less than $10.50, but the bulk of the tonnage is going at less than that price. The Pennsylvania railroad is offering scrap at its several shops in this territory, but it is not believed the material involved will command attractive prices.

### Offers Are Few

Cleveland, Oct. 28.—Iron and steel scrap market conditions seem to be reflecting to the last degree the dullness governing the general iron and steel trade. Despite the lower level of prices which has prevailed the past few days, little business is coming out. Scrap is loose, any offer bringing out unlimited amounts, but offers are few and far between. Mills are operating at a low percentage of capacity, have large stocks on hand or bargained for, and seem unwilling to tie up any more money under present conditions, even if big concessions are offered.

### Prices Fluctuate

Cincinnati, Oct. 26.—Dealers report that they are not doing any business worth mentioning and that the iron and steel scrap market is as quiet as it is possible for it to be. Prices show a wide fluctuation, as dealers will buy one lot at a certain price and then purchase the same kind of material from another source at an entirely different figure, depending upon conditions. No general level of quotations is being adhered to. Rolling mills in this territory, which are the largest users of scrap, report that they are well supplied and foundries, although buying in slightly larger lots because of the recent increase in the foundry business, are mostly contracting for short periods only.

### Prices Soft

St. Louis, Oct. 26.—Scrap at St. Louis is about as dull as it could be, with nothing to indicate an improvement in the near future. Prices, while tending to soften, have not been changed from last week.

### Scrap Market Stationary

Chicago, Oct. 27.—Without demand from consumers, dealers in scrap find their market entirely motionless and about the only transactions are forced sales on the part of brokers who have material which must be moved. Prices offered on the part of consumers are considerably below nominal quotations now in force and the tonnages thus moved are not of moment. Prices are so close to a minimum that unless a demand becomes apparent, it does not seem they could be lowered at present.

Railroads are before the market with 7,500 tons, as follows: C., M. & St. P., 1,500 tons; Chicago Great Western, 700 tons; Rock Island, 3,000 tons; C., B. & Q., 2,500 tons.

(For complete prices see page 840.)

## Ore Movement

### On the Lakes is Rapidly Drawing to a Close

The ore trade is rapidly drawing to a close on the lakes and will be practically over by the end of the present month. All of the Pittsburgh Steamship Co.'s barges are in winter quarters and the steamers are being dropped as they come down. Other shippers are sending their vessels to dock and there is practically nothing offering for the wild carrier except grain. Storms have been prevailing on the lakes during the past few days, but the vessels have generally avoided them by remaining in port. This delay will cut down October shipments somewhat, but the total season's movement will be approximately 32,000,000 tons.

## Steel Pipe Order Placed

Pittsburgh, Oct. 27.—Orders for between 70 and 85 miles of 6-inch, 8-inch, 10-inch and 12-inch steel line pipe for a gas line near Waco, Tex., have been placed in this district by a Buffalo interest. Couplings involved will be furnished by a Dayton, O., concern. No announcement has been made concerning regular card discounts after Nov. 1, when the extra 2½ per cent preferential discount will be withdrawn. Some improvement in specifications is reported by larger mills, but operations still hover around 50 per cent of capacity and below. Boiler tubes are quiet, and prices are weak and irregular.

## Tin Plate Price Not Announced

Pittsburgh, Oct. 27.—There has been no announcement concerning prices of tin plate for 1915 shipment. Demand for immediate delivery has been fairly heavy, and maximum quotations are being obtained by some makers in this district able to ship from stock.

The G. T. Eames Co., Kalamazoo, Mich., manufacturer of Eames compound mandrel presses, has changed its name to the Atlas Press Co. The corporation was organized about three years ago, and one year ago the Atlas Press Co. purchased the interest of G. T. Eames.

# Shape Market is Slow

## Few New Contracts Placed and Much Uncertainty as to Prices of Plain Material

Philadelphia, Oct. 26.—Some shape mill representatives in this district state that current market conditions are the dullest in their experience. New work is only of the smallest class and there is not an abundance of such inquiries. The mills continue to be forced to curb their outputs, but at the same time, their order books are steadily declining. Leading fabricators report their position is no more favorable than the shape mills. One large company whose capacity is about 3,500 tons weekly, entered last week less than 300 tons. Fabricated prices undergo sharp cutting wherever the order is attractive. Just what might be done on a large order for shapes at present is uncertain, but there is little doubt that it would bring out a figure considerably less than the usual quotations of 1.30c, Philadelphia, or 1.15c, Pittsburgh.

### Competition is Keen

New York, Oct. 27.—Competition for fabricated steel in this territory continues very sharp and was further accentuated in some of the lettings of the past week. On an award of 3,600 tons for a power plant in Newark the bids showed a range of $8 to $10 a ton. Work contracted for the past week in this territory amounted to 6,000 to 7,000 tons, but there is no improvement to the situation. The railroads continue to do practically nothing in structural requirements and a number of commercial propositions are held up for financial reasons. A considerable tonnage of subway steel remains unplaced by the general contractors. Recent fabricated prices indicate that considerably lower than 1.31c, New York, or 1.15c, Pittsburgh, is being figured in plain material and, in fact, the market at the open figure given appears soft.

### New Cleveland Buildings

Cleveland, Oct. 27.—Bids have been received on the Lindner building, which will require about 1,000 tons of steel. The award has not yet been made. The steel for the Union National Bank building for which the Crowell-Lundoff-Little Co. has the general contract, will not be awarded until about Jan. 1. The new sheet mills which will be built by the Empire Rolling Mill Co. will require about 600 tons of steel.

### Structurals Are Slow

Chicago, Oct. 27.—The past week has been described by some sellers as the quietest in a structural way than has been experienced in many months. Only two contracts have been closed and the aggregate tonnage of the two is a trifle over 700. As a result of competition for the small business that is available, quotations are now 1.25c to 1.33c, Chicago, with only the least desirable taking the maximum.

#### CONTRACTS AWARDED.

Essex Power Station, Newark, N. J., for Public Service Commission of New Jersey, 4,000 tons, to the Lackawanna Bridge Co., Buffalo.

E. P. Bailey Co., Utica, N. Y., 100 tons, to Utica Steam Engine & Boiler Works.

Essex power house, Newark, N. J., 3,600 tons, awarded Lackawanna Bridge Co. and the steel will be furnished by the Lackawanna Steel Co.

Apartment house for the Fullerton-Weaver Co., at 400 Park avenue, New York City, awarded to the Hinkle Iron Works.

Public school in the Bronx, New York City, 400 tons, awarded Hinkle Iron Works.

Highway span for the Seneca branch of the New York State barge canal, 700 tons, awarded Phoenix Bridge Co.

Yorkville Talmud-Torah school, Fifty-seventh street, New York City, 250 tons, awarded Hinkle Iron Works.

Addition to Liberty Baking Co., Pittsburgh, 250 tons, Jones & Laughlin Steel Co.

American Tar Products Co., three buildings, one each at Woodward, Ala., Youngstown, O., and St. Louis, Mo., 207 tons, to McClintic-Marshall Co.

Hanover street bridge, Baltimore, Md., 500 tons to Mount Vernon Bridge Co.

Madison Square Theater, East Seventy-ninth street and Hough avenue, Cleveland, 200 tons, to T. H. Brooks & Co.

Memorial building for Women of the Civil War, Washington, D. C., 450 tons awarded to American Bridge Co.

Reconstruction of Pier No. 36, Philadelphia, of the Philadelphia & Reading railroad, 750 tons, awarded to L. F. Shoemaker & Co.

#### CONTRACTS PENDING.

Overhead crossing work for Pennsylvania railroad at Wilkinsburg, Pa., 500 to 600 tons; bids taken.

Lindner building, Cleveland, 1,000 tons, bids received.

Empire Rolling Mill Co., Cleveland, sheet mill, 600 tons.

Troop I armory and stable, Buffalo, 400 tons, bids open Oct. 20.

Schenley high school, Pittsburgh, 1,300 tons. Bids close Nov. 3.

Library Apartment, Pittsburgh, 600 tons.

Bids closed Oct. 27 on 750 tons for Panama Canal work.

Addition to the McAlpin Hotel, Thirty-third street, New York City, 1,000 tons, award expected soon.

High school in the Bronx, New York City, 1,100 tons, Midtown Construction Co. awarded general contract under revised bids. Steel now being asked.

Commonwealth pier, Boston, Mass., 2,300 tons, original bids rejected and will be readvertised.

(*For complete prices see page* 840.)

# Rail Orders

## Placed by the Baltimore & Ohio With Steel Corporation

New York, Oct. 28. (By wire.)—The Baltimore & Ohio railroad has placed 2,500 tons of rails additional with the United States Steel Corporation, of which 1,500 tons goes to the Illinois Steel Co. and 1,000 tons to the Carnegie Steel Co. The Rock Island railroad still figures on rails.

### A Little More Activity

New York, Oct. 27.—A slightly greater activity is noted in railroad equipment, in contrast to the extremely dull weeks that have prevailed recently, but this change is so small that it fails to excite much interest. The Northern Pacific railroad has ordered 750 steel underframes from the Haskell & Barker Car Mfg. Co., and also is in the market for 95 passenger equipment types. The New York Central railroad asks 200 underframes which is expected to go to the Merchants Despatch Transportation Co. A report that the Nashville, Chattanooga & St. Louis railroad has placed 1,000 box cars lacks confirmation.

Japan continues to be a prospective purchaser of freight cars and there are some reports that this country will require a large number. Such inquiries as have been put out definitely, however, have been small and call for box and flat cars of a light type.

### Railroads More Active

Chicago, Oct. 27.—A slightly larger volume of inquiry and buying of various railway supplies is noted in some quarters and track fastenings and materials of this sort are moving in slightly better volume than has been the case. This demand does not approach the proportion of a buying movement and probably is covering necessities of railroads to enter the winter and will be utilized in putting tracks in condition for the usual stress of cold weather.

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The Siemens Halske Co., 90 West street, New York City, which has the contract to install two 20-ton electric induction furnaces in the new steel works of the American Iron & Steel Mfg. Co., Lebanon, Pa., will start the work of putting in these units in a short time. The four 50-ton open-hearth furnaces of the company, in conjunction with which the electric furnaces will be operated, are approaching completion but are not expected to be ready for a charge before some time after Jan. 1.

# British Pig Declines

## To a Greater Extent Than at Any Time Since the War Started—Hopeful Feeling Prevails

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Oct. 16.

There are signs that some of the British people are becoming "nervy", and occasionally one meets a sample croaker ready to join the "All Is Lost League", and who solemnly tells one, "It's my belief this little island will be untenable in a week." The *Times* is partly responsible for this through the confident prediction of its military correspondent yesterday that an attempt at invasion may be looked for either from Ostend or Dunkirk. It has since been pointed out that the writer ignored in an amazing manner the existence and the potency of the British Navy, which could certainly dispose of German troop-ships as effectually as it has convoyed our own transports to the Continent. Generally speaking, German threats and scoldings have equally failed to make our flesh creep and while we all feel very sorely the horrible maltreatment of Belgium, we are very well satisfied with the almost daily squeezing back of Germans toward their own country.

The situation, however, is still sufficiently anxious to discourage enterprice, and no great amount of new work is being given out. At the same time, real distress is non-existent.

### Pig Iron Declines

The downfall of prices in Cleveland pig iron has been more pronounced this week than since the war began. There has been a fall of 1s 8d (40c), bringing the selling price to that of last November. Yesterday, there was a slight rise in the day of 4d (10c), which shows how sensitive the market is to every international influence. There has been a good deal of realizing by warrant holders, and consumers still confidently look for lower prices; but it is significant that Cleveland makers decline to follow the slump of speculators, and the output has also not changed. Owing to the continued dangers of the North Sea, shipments are small and only amount to 16,000 tons since the beginning of the month, an average of 1,000 per day. Warrant stocks have increased by 4,000 tons. Yesterday's quotations were 48s 7d ($12.14), and the amount in store was 107,000 tons. In all other markets the prices are somewhat weaker. At the Birmingham meeting on Thursday pig iron could have been bought at figures 2s (48c) below those of a week ago, but nothing was doing, and probably no concession would have tempted business.

### Finished Iron and Steel

The buying of finished steel outside war requirements has for the time being almost ceased, apparently on account of the depressed mood of the trading public. Apart from this, buyers contend that war prices were unduly inflated, and are certain to come down very shortly. In spite of this there is very little idleness, and most mills can make full time. The scarcity of men is causing some embarrassment, but this condition affects the coal trade much more directly. Mill workers are gradually being replaced, though it is a rather formidable task to secure the requisite skill, and smaller outputs are involving a certain amount of loss. It is likely the iron trade will be less affected, as the government is practically discouraging enlistments on the part of the workers in any trade furnishing war material. Orders for a great variety of iron and steel for war purposes continue to pour forth from the War Office. They include galvanized iron plates for trenching work, barbed wire, horseshoe iron, stampings for motor material, and axle iron for gun wheels, load vans, etc. While there are some foreign inquiries, this business is really hanging fire through financial and shipping conditions. The complete absence of all Continental steel is helping the steel trade, but American competition is being keenly watched, and is preventing the taking of any liberties in the matter of prices. Recent meetings of steel makers have merely confirmed the existing rates, although a very good demand exists. An exception is wire rods, which have been increased about 5s ($1.20) per ton. These continue very difficult to get, the make being in few hands. For years this has been a half-finished product, which British steel mills apparently considered themselves better without, and this has almost driven the British consumer into the hands of German makers. A further advance of £1 ($4.80) in wire has had to be made lately, making the price £10.15 ($51.60).

Recent negotiations with American sellers of billets have led to some business, and consumers and merchants alike speak very confidently of American steel mills as being a sound and reliable source of supply during the continuance of the war.

## Moderate Activity

Chicago, Oct. 27.—Purchases of steel products from store continue to be made more sparingly than during the early fall, as construction has been largely completed or brought past the point where such materials are needed. Business is moderately active, but considerably below normal for this season.

# METAL MARKETS

## New York

Oct. 27.

The copper market has a better tone, as both domestic and foreign buying is more active. Exports of copper this month to date have been 22,183 tons, as compared with 18,750 tons in the corresponding month in 1913. Sellers are quoting electrolytic at 11.50 delivered 30 days but have not made many sales at this figure and the real market is around 11.37½c. Prime lake is quiet at 11.50c, New York.

The outside market on lead shows a little more firmness and 3.37½c St. Louis, equivalent to 3.52½c, New York, is quoted. The trust price, however, remains unchanged at 3.50c, New York at 3.42½c St. Louis. The recent buying of lead for shipment to Russia, now appears to be pretty well over and the last shipment before navigation closes in the Baltic Sea, is going forward today. Domestic buyers of lead have been in the market only moderately.

The call for aluminum from domestic consumers at present, is slight. There is no foreign inquiry, though it is believed Germany would be a buyer if that country could obtain delivery of the metal. Sellers today declined bids from buyers of 18c, New York, for spot and are holding for 19c. On future deliveries running through next year, the Aluminum Co. of America continues to ask 19.50c, Niagara Falls.

Antimony has continued to advance under a strong demand both in this country and from abroad, particularly from Russia. The higher grades in this country have been pretty well cleaned up and a sale of 20 tons of Cookson's was made today at 17c, New York duty paid. There is very little of this grade now in the country and it is stated there will be no fresh offerings up to Jan. 1, as Russia, in addition to the tonnage obtained in the United States, has purchased heavily from makers direct in England. Some sellers predict that Cookson's may reach 22c to 23c. Hallett's is very scarce and is nominal at 16c. Chinese is quoted 14c for spot and 12c for future.

Tin plate makers continue to sound the tin market for their forward requirements, through the first quarter and beyond. Sellers, however, owing to their inability to cover so far ahead, are cautious, though a few sales to such consumers have been made. Lower foreign exchange and quieter demand has weakened the market slightly and spot is quoted at 31c to 31.12½c with November 30.75c to 31c, December 30.50c to 30.75c, January 30.25c to 30.50c, and February 30.00c to 30.25c.

Foreign requirements of spelter have been well covered for the moment and the market is quieter and slightly easier. Business was being done today at 4.95c to 5.05c, New York, or 4.80c to 4.90c, St. Louis.

# Freight Rate Advance

## In Central Freight Association Territory Effective —Panama Rate Reduced

Washington, Oct. 27.—Rate advances of 5 per cent on all class and most commodity freight in Central Freight Association territory, allowed by the Interstate Commerce Commission last July in the Eastern advance rate case, became effective yesterday.. It was confidently expected that the Commission would issue a suspension order including limestone in the list of commodities exempted from the increase, but none was forthcoming. This is the only pig iron making material which was given an increased rate. The advanced rate as well as rates existing before it went into effect will be attacked by iron and steel interests, according to preparations now under way.

### Rates From Pittsburgh

Pittsburgh, Oct. 28. (By wire.)—The advanced freight rates on iron and steel commodities allowed some time ago by the Interstate Commerce Commission went into effect Monday in the territory west of Pittsburgh and Buffalo and east of the Mississippi river and north of the Ohio river. The rates on carload lots from Pittsburgh are advanced as follows, per 100 pounds: Buffalo, from 11 to 11.6 cents; Cleveland, from 10 to 10.5 cents; Cincinnati, from 15 to 15.8 cents; Chicago, from 18 to 18.9 cents; Denver, from 67.5 to 68.6 cents; St. Louis, from 22.5 to 23.6 cents. The rate from Pittsburgh to Minneapolis, 32 cents per 100 pounds, will not be changed until Nov. 16, when it will advance to 32.9 cents.

### Rates Suspended

Chicago, Oct. 27.—The Illinois Public Utilities Commission has issued an order suspending the 5 per cent freight increases on intrastate shipments proposed by 78 railroads in Illinois. These were to have been effective Nov. 16 and are postponed by the Commission until March 16, 1915. A hearing will be held in November.

These increases sought by the railroads are entirely separate from the so-called 5 per cent rate case on interstate shipments recently passed on by the Interstate Commerce Commission.

### Panama Rate Reduced

New York, Oct. 28. (By wire.)—Steamship lines running between eastern ports and the Pacific coast through the canal have reduced freight rates from $1 to 25 cents per ton on ordinary bulk steel products. The new rate means 41 cents from Pittsburgh, as compared with the old rate of 46 cents. The reduction will further favor American mills in protecting Pacific coast business against foreign competition.

## Active Foreign Inquiry

New York, Oct. 28. (By wire.)—Heavy inquiries for export, some for belligerent nations, continue under negotiation. Russia enters the market for 10,000 tons of 20-pound rails. Greece is inquiring for a round tonnage of soft steel bars. Other large negotiations are going forward.

The Lehigh Valley is in the market for three car floats, about 500 tons each.

## Salaries Cut

Pittsburgh, Oct. 28. (By wire.)—Closely following a reduction of 10 per cent in pay to salaried employes of the Whitacre-Glessner Co., The Wheeling Corrugating Co. and the Portsmouth Steel Co., allied interest in the Wheeling district, it was officially announced yesterday that a similar cut had been made by La Belle Iron Works, Steubenville, O., of salaried men including officers. Laborers were not included in the cut. Operating schedules, however, are practically equivalent to a cut in wages.

## Receivers for Iron Companies

Haulings Lippincott, president of the National State Bank of Camden, N. J., has been appointed receiver of the Camden Iron Works, Camden, N. J., and Harold Wells, an attorney of Bordentown, N. J., has been made receiver of the Florence Iron Works, Florence, N. J. These receiverships have grown out of the recent suit instituted by the executors of the estate of the late Stuart Wood against Walter Wood, the surviving partner of R. D. Wood & Co., Philadelphia, which are the selling agents and financial agents for the Camden Iron Works and the Florence Iron Works. The receivers have been named to protect all parties and interests as the result of the litigations surrounding R. D. Wood & Co. Receivers also have been named for R. D. Wood & Co.

## Shattered

### Says Johnson, Are Arguments Against Steel Corporation

Philadelphia, Oct. 28. (By wire.)—Although practically all points in the Steel Corporation suit now have been argued before the circuit court here, today was most important as far as popular interest was concerned. Yesterday it was announced that John G. Johnson would speak today, and such is the power of his name that the court room was crowded half an hour before the opening time.

Mr. Johnson accuses the government attorneys of basing the entire case on points picked out of the record here and there, and he says that many of their arguments are shattered by the mass of the testimony. He says also that they beg the issue of restraint of trading and bring in the old pools which have nothing to do with the question of restraint.

Mr. Johnson, summing up the main issues in the case, declared that in no case is the Corporation reprehensible as a violator of the Sherman law as defined by decisions. The arguments will probably be closed tomorrow.

## Will Visit Bureau of Standards

Members of the Pittsburgh Foundrymen's Association will visit the United States Bureau of Standards, Pittsburgh, Nov. 2. A special car will carry members to the arsenal building, where work undertaken by the bureau will be explained and described by P. H. Bates, chief of the Pittsburgh branch of the bureau of standards. The program will include tests of refractory brick under load; work performed by experimental furnaces, and tests of steel, gray iron and malleable iron. The regular monthly dinner and meeting of the association will follow the inspection trip. Dinner will be served at the Fort Pitt hotel at 6:30 o'clock, following which Mr. Bates will talk informally on the work of the bureau and its relation to the foundry trade.

## Wages Reduced

The J. G. Brill Co., of Philadelphia, manufacturer of street cars, has announced a general reduction of 10 per cent in wages and salaries. All the employes, from the president down, have been effected similarly. It is announced by the company that full wages will not be restored until conditions become normal. The company's operations now are averaging about three days a week.

# CORPORATION BLESSING TO COUNTRY

## Declared Lindabury in His Eloquent Argument in Dissolution Suit

### Battle of Great Lawyers in the United States Court of Appeals at Philadelphia---Arguments Follow Closely the Briefs Filed by Plaintiff and Defendants ---Interesting Features of Speeches---Sketches of Lives of the Judges

Final argument of the suit of the government for the dissolution of the United States Steel Corporation, which was commenced before the United States circuit court of appeals in the Federal building, Philadelphia, Tuesday, Oct. 20, was continued until Friday afternoon. An adjournment was then taken until Monday, when the arguments were resumed. On the opening of the court, the opposing attorneys informed the judges that each side would require 10 hours to complete its argument, which provided for the completion of the presentation of the case on Friday. The magnitude of the case, and the many points involved, however, soon made it evident that this time would not be sufficient, and hence the court granted an extension of time covering Monday and Tuesday of this week. The arguments which were submitted were entirely along the line of the briefs; of these summaries were published in the two preceding issues of THE IRON TRADE REVIEW. The government, however, called attention to the recent decision modifying the original decision in the International Harvester dissolution suit. The new decision was rendered after the government's brief had been printed. The government contended that the present suit should be decided along the same lines of consideration which ruled the court in deciding the Harvester case. It contended that the subsidiaries of the Steel Corporation were competitors before being taken into the Corporation; it admitted, however, that they were not competitive to so great an extent as in the case of the companies which went into the Harvester company.

The presence of the four black-robed figures on the bench and the all-pervading formality and dignity of the court room provided the setting for the trial, while the presence of the array of distinguished attorneys gave a hint of the tremendous issues involved in the case. Spectators were almost entirely missing the first day, but each day after that the court room was thronged with local attorneys and young law students, officers of the various independent steel companies and stockholders of the Corporation, all interested in the case from a different standpoint. There also were a few spectators who made it a practice to be on hand early, in order that they might secure one of the luxurious leather-upholstered chairs; in these they would soon fall asleep, undisturbed in their slumbers by the rumbling discourses of the lawyers.

To the spectators' side, and in front of the bench, was the large, oval-shaped table round which the attorneys for the defense ranged themselves. There were Richard V. Lindabury, John G. Johnson, Cordenio A. Severance, David A. Reed and Raynal C. Bolling for the Steel Corporation; A. Wellwood Murray for John D. Rockefeller, and Frederick R. Kellogg and Chester W. Cuthell for the Great Northern ore interests. Flanking the lawyers were a number of secretaries and stenographers. With the Steel Corporation lawyers sat Judge E. H. Gary, chairman of the Steel Corporation, and Percival Roberts Jr., a director, both defendants in the suit.

In marked contrast to the large array of legal talent gathered together in the interest of the defense, the government was represented by two lone attorneys, who sat in splendid isolation at a table to the left. These were Judge Jacob M. Dickinson and Henry E. Colton, both special assistants to the attorney general. Mr. Dickinson, however, who in addition to being a former secretary of war, long has been looked upon as one of the leading lawyers in the country, easily stood out as the most distinguished looking figure in the room. Of towering stature and fearless mein, with the head and shoulders of a great statue, he appeared worthy of the confidence of the government and the respect of the court as he made his way to the bar to open the argument for the prosecution. Forceful, persistent, bluff and to the point, he proceeded in his argument in the manner of a man who meets his enemy in the open and would smite him hip and thigh. The directness which characterized his whole address was reflected in his final remarks, which were as follows:

"In conclusion, we pray that the United States Steel Corporation be dissolved in such a manner as to restore conditions of competition; also, that those who at the time of the formation of the Corporation sold their properties for more than their actual worth be held accountable in order that the innocent may suffer as little as possible for the sins of the guilty. We further ask that restitution be made wherever possible."

An interesting feature of the arguments by Messrs. Dickinson and Colton was the comparatively small proportion of the voluminous evidence in the great case which was considered by the government in preparing its brief. By far the weight of the government's case was based on old documents, such as the records of the old "pool" meetings, minutes of meetings of the Carnegie board of managers, minutes of meetings of the Steel Corporation executive committee and board of directors, and upon old letters. In comparison, the oral testimony of witnesses examined during the long drawn out series of hearings was referred to only in a scattered way. The documentary evidence, the government claimed, is in the nature of contemporaneously written history of the various phases in

*(Continued on page 832.)*

# MEN OF THE IRON TRADE

**Who they are  Where they are  What they are doing**

Joseph Kramer, who has been vice president of the Kramer Brothers' Foundry Co., Dayton, since its organization 21 years ago, has become sole owner.

J. Rogers Flannery, chairman of the Pittsburgh foreign trades commission, and president of the Flannery Bolt Co., Pittsburgh, talked about "Foreign Trade for Pittsburgh," before the Chamber of Commerce, Oct. 27. He will sail for England within a fortnight, in the interests of Pittsburgh manufacturers.

Edwin Hoyt Peirce, bureau chief of the physical laboratories of the Amer-

EDWIN HOYT PEIRCE,
New Member American Iron and Steel Institute

ican Steel & Wire Co., Worcester, Mass., is a newly elected member of the American Iron and Steel Institute. He was born in Everett, Mass., June 20, 1881. Mr. Peirce graduated from Harvard in 1904 and was a chemist for two years in the United States navy department at the United States naval torpedo station. The following year he became assistant chemist for the American Telegraph & Telephone Co. at Boston. In August, 1907, he entered the employ of the American Steel & Wire Co., and in 1910 was put in charge of the physical laboratories, a new department organized for experimental and research work exclusively. Mr. Peirce made a trip to Europe in 1911 for the United States Steel Corporation, in connection with electrical furnaces and testing laboratories. He is a member of the American Society for Testing Materials.

Adrian Herzovitch, professor of engineering at the University of Moscow, Moscow, Russia, is visiting iron and steel plants in this country to study methods of rolling mill practice.

F. N. Speller, metallurgical engineer for the National Tube Co., Pittsburgh, read a paper, recently on "The Modern Boiler Tube or Locomotive Service," before the St. Louis Railway Club, St. Louis.

Frank H. Colladay, district sales manager, is in charge of the eastern sales office recently opened in the Grand Central Terminal building, New York City, by the Trumbull Steel Co., Warren, O.

W. H. Van Dervoort, president of the Roat & Van Dervoort Engineering Co., and of the Moline Automobile Co., East Moline, Ill., has been nominated for president of the Society of Automobile Engineers.

L. H. Barnett, assistant to the president of the Carnegie Steel Co., Pittsburgh, last week gave an illustrated lecture on "Safety First," in the parish rooms of St. Mary's Episcopal Memorial church, that city.

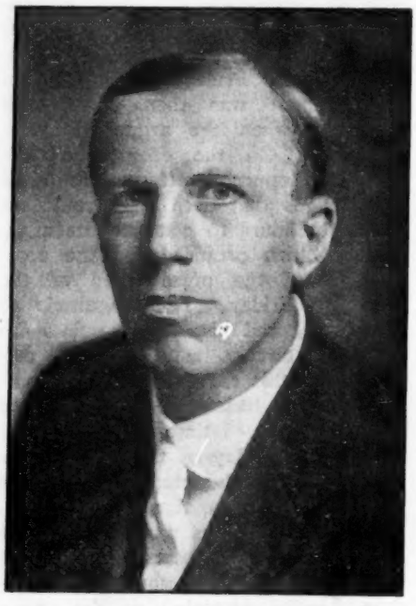
Dr. Karl G. Frank, the American representative of the Siemens Halske Co. of Berlin, with headquarters at 90 West street, New York City, has returned after a several months' stay in Germany, which was prolonged because of war conditions.

H. S. Lewis, manager of the Pittsburgh office of the National Fuel Co., Uniontown, Pa., has resigned. He will open an office in the Oliver building and will handle coal and coke. C. R. Wilson, general sales agent of the National company, will have charge of the Pittsburgh office. He will be assisted by R. H. Knode and Jules Gondon.

H. J. Thorkelson, professor of steam and gas engineering, college of engineering, University of Wisconsin, Madison, has been appointed temporary or acting business manager of the university pending the selection of a successor to Dr. H. C. Bumpus, who resigned, effective Nov. 1 to become president of Tufts college, Massachusetts.

Dean C. B. Connelley, of the Carnegie Institute of Technology, Pittsburgh, recently appointed a member of the educational committee of the American Foundrymen's Association, last week, told members of the Pittsburgh Sheet Metal Workers' Association of advantages offered by the Carnegie Institute to young men interested in vocational education.

Frederick C. Brunke, manager of sales for the United States Steel Products Co. in Toronto, worked his way up from an office boy. He was born Sept. 23, 1876, and after graduating from high school, started with the Carnegie Steel Co.'s office, at Buffalo, in 1892. He became an expert stenographer, was traveling salesman and later chief salesman. The office of



FREDERICK C. BRUNKE,
New Member American Iron and Steel Institute

which he is manager sells in the district covering western Ontario. Mr. Brunke is a member of the American Iron and Steel Institute.

Pennock Hart, treasurer of Mackintosh, Hemphill & Co., Pittsburgh, has been elected president of that company to succeed the late Joseph Fawell, who died Oct. 2. Mr. Hart has been connected with the Mackintosh-Hemphill interest for about 35 years. Five years after becoming identified with the concern he was appointed assistant treasurer and a short time later was elected treasurer to succeed Dr. W. S. Mackintosh. Mr. Hart is the son of the late N. F. Hart, who, with James Hemphill and Dr. Mackintosh, organized the firm of Mackintosh, Hemphill & Co. in 1858.

## Best Earnings

**For Year, But Corporation Reduces Common Dividend**

A reduction of ¾ of 1 per cent or from 1¼ to ½ per cent in the quarterly dividend rate on the common stock, was made by the directors of the United States Steel Corporation at New York, Oct. 27, upon the basis of the earnings shown for the third quarter ended Sept. 30. The action in cutting the dividend, which was expected generally is due to the prevailing condition of business Judge Gary announced. In a statement made public in connection with the publication of the quarterly report, Judge Gary said:

"The decision concerning the dividend of the common stock was made with reluctance by the board of directors, but they were of the opinion that it was necessary by the present conditions of business and the prospects for the immediate future."

The reduction of the common dividend represents the first change in the rate of 1¼ per cent quarterly, which has prevailed uniformly since the first quarter of 1910. In the closing quarter of 1909, an extra dividend of ¾ per cent was declared, making the rate for that year 5½ per cent. The common dividend of ½ per cent for the third quarter just ended is payable Dec. 30 to holders of record Dec. 1. The regular quarterly dividend of 1¾ per cent on the preferred stock was ordered paid Nov. 28 to stockholders of record Nov. 2.

The earnings of the Steel Corporation for the third quarter were the best of the current year, totaling $22,276,002, as against $20,457,596 for the quarter ended June 30, and $17,994,381 for the quarter ended March 31. The earnings for the third quarter of 1913 were $38,450,400. After the regular allowances and the funds set aside for dividends, a surplus of $89,479 is shown for the third quarter, which compares with a deficit of $5,159,237 the second quarter, and $6,289,644 for the first quarter of the current year.

## Organize Drop Forge Association

Detroit, Oct. 24.—The American Drop Forge Association has been formed here following a meeting of 20 superintendents of shops at the Hotel Pontchartrain. Four states and Canada were represented. The purpose of the organization is educational. Temporary officers were elected and permanent officers will be named at a meeting to be held within a few weeks. The states represented were Ohio, Virginia, Indiana and Michigan. Officers elected were: President, R. R. Ellis, superintendent of the Detroit Forging Co.; vice president, George Desautels, manufacturing manager of the Anderson Forge & Machine Co.; secretary, A. E. Dibble, department manager of the Frost Gear & Forge Co., of Jackson, and treasurer, E. B. Horne, forge and foundry superintendent of the Packard Motor Car Co.

## Gets Ready

**Birmingham Prepares to Entertain Institute Members**

Birmingham, Ala., Oct. 28. (By wire.)—All preparations for the Institute meeting are completed and it is evident that the citizens of Birmingham will do everything in their power to make the stay of visitors enjoyable. In addition to the entertainment features previously announced, there will be a barbecue Friday noon, a dansant at the Southern Club Thursday afternoon, and a ball at Country Club Friday night.

The dinner to Judge Gary at the Birmingham Newspaper Club will have special gridiron features.

Secretary McCleary arrived Tuesday, having spent Monday sightseeing at Chattanooga. Among the first members to arrive was L. R. Lemoine, president of the United States Cast Iron Pipe & Foundry Co.

## Chemical Engineers to Meet

The seventh annual meeting of the American Institute of Chemical Engineers will be held in Philadelphia Dec. 2 to 5. A program of excursions to a number of the large chemical manufacturing plants in and around Philadelphia, is being arranged. A number of addresses and papers on "The Present Opportunities for American Chemical Industries" will be delivered by prominent chemical engineers and business men.

Clinton H. Scovell & Co., certified public accountants and industrial engineers, announce they have effected a combination with Wright, Schooley & Morse, of New York City, and will continue their organization and offices in the Woolworth building.

The Granby Mining & Smelting Co., East St. Louis, Ill., will start operations on Jan. 1, according to information given out by its president, E. S. Gatch. The plant will employ 1,000 men.

## Legislation

**And Other Topics to be Discussed by National Founders' Association**

The annual convention of the National Founders' Association will be held at the Hotel Astor, New York, Nov. 18 and 19. The convention sessions proper will be preceded by the meeting of the executive council Tuesday, Nov. 17, at 10 o'clock and the alumni dinner Tuesday evening at 6:30 o'clock. The annual banquet of the association will take place Wednesday evening at the Hotel Astor, the galleries being opened to the ladies. Hon. George H. Monaghan of Detroit, Mich., will be toastmaster and the speaker of the evening will be Major Edward J. Boughton, judge advocate of the military district of Colorado, who will speak on "The Coal Strike and Rebellion in Colorado." One other speaker will be provided, to be announced later.

Wednesday morning, after the appointment of committees and the reading of reports of officers, Marshall Cushing will speak on "The Social and Political Significance of Recent Labor Legislation." At the session Wednesday afternoon, papers will be read as follows: "Constitutional Changes and Industrial Progress," by George F. Monaghan, general attorney for National Founders' Association; "The Federal Commission on Industrial Relations," by Walter Drew, commissioner, National Erectors' Association. Magnus W. Alexander, chairman of the committee on safety and sanitation, will make a report on "Foundry Hazards and How to Guard Against Them."

Thursday morning C. A. Chase, Syracuse, will speak on the New York state workmen's compensation law and James A. Emery, counsel for the National Council for Industrial Defense, will discuss the question "How Does the Recent Federal Legislation Affect Labor Combinations?" Numerous other subjects will be considered.

The present officers of the association are: President, Wm. H. Barr, Buffalo; vice president, Otto H. Falk, president of the Allis-Chalmers Mfg. Co., Milwaukee; commissioner, A. E. McClintock, Chicago; secretary, J. M. Taylor, Chicago; treasurer, Chicago Savings Bank & Trust Co., Chicago.

## Fairbank Has Retired

George W. Fairbank, Cleveland, has retired as vice president of Struthers Furnace Co., also of that city, effective Oct. 13. Mr. Fairbank has been connected with the Struthers furnace interests for 18 years and is widely known throughout the country because of his long connection with the pig iron and iron ore business.

## Wuest Says

**That Probably European War Will Not Be Decisive**

Robert Wuest, former commissioner of the National Metal Trades Association, who has returned after a sojourn of 18 months abroad, is congratulating himself and being congratulated by his many friends upon his fortunate escape from the center of the European war zone. Early in July, he sailed with a tourist party for a cruise through the Arctic circle on the Hamburg-American Line steamship Friedrich Wilhelm, the party including Germans, French, Russians, English and Americans. While near Iceland, they received by wireless word of the European outbreak and started back to Germany, but, after being pursued by a British gunboat, the vessel docked at Bergen, a small Norwegian seaport, where the party was delayed for six weeks.

"I feel sure that the war in Europe will not end with either side absolutely victorious," said Mr. Wuest, "for it is my belief they will exhaust each other eventually and agree to quit. It is my earnest hope that in the meantime no American will undertake to inject himself into the controversy with an offer to mediate, for the time has not arrived and may not for a considerable period."

Mr. Wuest left the United States somewhat broken in health, due to his strenuous labors, but has returned so fully restored to strength that his friends are greatly delighted. He will not resume business activities probably until next spring.

## Ship Bill

**Is on the Administration Program for Next Session**

Washington, Oct. 27.—It is the plan of President Wilson to head his legislative program for the new session of Congress, beginning Dec. 7, with the ship purchase bill. He made this known in a talk yesterday with visitors. It is proposed to follow this with conservation bills and Philippine legislation.

The President feels that the actual business program has been completed as the result of the labors of the long, weary session of the sixty-third Congress and that the business world now may have a much deserved rest from legislative worries. Much lies ahead, according to the administration program, for action, and it is realized that the difficulty will be in the narrowing of the list to make it possible for Congress to do the work, yet remain in session only the normal length of time. It is the idea of the administration that the House will act upon such bills as it has not already passed and will send these to the Senate. Then, while appropriation bills are being discussed by the House, the Senate will handle bills sent from the lower body.

## Oxygen Plant

**To be Built in Philadelphia by Linde Air Products Co.**

The Linde Air Products Co. New York City will erect its twelfth commercial oxygen plant at the southeast corner of Eighteenth and Cambria streets, Philadelphia. The building will be one story, fireproof throughout and of brick, steel and concrete construction. Its equipment will consist of the special Linde rectifying apparatus, together with the necessary air compressors, oxygen pumps, etc., all electrically operated with individual drive. In planning the plant, the Linde company is pursuing its customary policy of anticipating large increases in the sale and use of oxygen and, therefore, space has been allowed for doubling the capacity of the plant. The present installation is duplex and is calculated to produce an output of 2,000,000 cubic feet of oxygen per month. The ultimate output, when the second duplex unit is placed in operation, will be 4,000,000 cubic feet per month.

During the past two years, the Linde company has built nine plants and others are in contemplation of erection. It has been the policy of this company to facilitate the use of oxygen in the various industries by furnishing this commodity with as little expense for transportation as possible and at prices which are calculated to make oxygen available to any industry where a process of manufacture can be facilitated.

## Reparation

**For Alleged Illegal Charges Asked by Steel Products Company**

Washington, Oct. 27.—Four petitions were filed yesterday with the Interstate Commerce Commission by the United States Steel Products Co. asking a total reparation of $12,040 for alleged unlawful charges by railroads of $2.50 per car switched to the company's warehouses in Los Angeles and San Francisco. One petition is directed against the Santa Fe asking reparation of $3,262.50 for such switching at those two cities; another against the Western Pacific for $1,090 for switching at San Francisco.

## Home Products

**Will be Displayed in Made in America Exhibit**

Chicago, Oct. 27.—The first "Made in America" exhibit will be held in the First Regiment Armory, Sixteenth and Michigan avenue, Chicago, during the week of December 7-13. This is an expression of the movement now active in this country looking to greater buying of products made in this country rather than abroad.

The Chicago exhibit will be followed by a similar show in New York, probably in January.

It is probable the present show will be devoted largely to raw materials, and space is being taken by concerns interested in enlarging their markets for that sort of products.

The object of the show is to make plain to producers and consumers that articles of common use made in America are not properly appreciated, that articles hitherto made in Europe should and can be made here, that persons willing to start new plants in this country manufacturing articles hitherto made abroad at present have a great opportunity and that the extent to which the buying public now patronizes American producers is small while the extent to which it may be educated is large.

A program to drive home the truths above stated will be provided as an added attraction to the show.

## Making 40 Per Cent Ferro

No. 1 stack of the American Manganese Mfg. Co., Philadelphia, at Dunbar, Pa., now is operating on 40 per cent ferro-manganese. The furnace, blown in a fortnight ago, operated on high manganese for several days and then changed to spiegel. Several analyses of spiegel ran about as follows: Silicon, 0.99; sulphur, 0.01; phosphorus, 0.19, and manganese, 25.34. On Oct. 26 the stack changed to ferro-manganese, and the average manganese analysis for that day is given as 40 per cent. The furnace is running on domestic ores, obtained from Crow county, Minn.

## Export Lathes

Bardons & Oliver, machine tool builders, Cleveland, have finished shipping on an order for three carloads of lathes for export to Europe. The nations now at war have been making heavy purchases of machine tools in this country, notably in the New York and Cincinnati districts, to equip their arsenals and factories.

# Using Turbines to Save Money

## How the Tennessee Coal, Iron & Railroad Co. Obtained Additional Power Without Adding to the Consumption of Fuel

BY F G CUTLER

FOR some years past there have been few radical changes effected in the process of manufacture of iron and steel and the attention of the managers has been largely directed toward improvements in organization to increase the efficiency of labor and reduce operating costs, so that while the selling price of almost every other article of commerce is greater, and while the cost of labor is higher, it has been possible to maintain or lower the unit selling price of iron and steel products.

In accomplishing this result reductions in the cost of power have held an important place. These reductions have been effected in various ways among which may be mentioned the installation of apparatus of higher economy, such as low or mixed pressure turbines. By the term mixed pressure turbines is meant a turbine that will take either low pressure or high pressure steam or both.

A striking example of the possibilities of the last mentioned plan is afforded by the Ensley plant of the Tennessee Coal, Iron & Railroad Co. At the time of its acquisition by the Corporation, this plant had seven boiler houses and two electric power stations, with a total rated capacity of 1,800 kilowatts and a third power station of 1,800 kilowatts capacity had just been completed. All of the engines in the plant operated non-condensing, and no power was supplied to the outside plants. Additional electric power was required for various purposes and the enlargement of the blast furnaces consequent to changing them from hand-filled furnaces to skip-filled furnaces taxed the blowing engines, so that it was found advisable to materially increase the blowing capacity.

A saving in steam requirements might have been obtained at the mill by the installation of compound condensing mill engines and the steam saved applied to the generation of additional power, but this involved the displacement of practically new equipment, which was ample for the work under non-condensing conditions. Also, at the blast furnaces, there was a new boiler house of 16,000 horsepower capacity, together with another plant of 6,500 horsepower, which together with the fact that the blowing engines were comparatively new, as well as certain conditions connected with water supply, practically committed this plant to steam-driven apparatus.

All of this original apparatus having been operated non-condensing, low pressure turbines were of particular advantage to the plant in that no change in engine conditions was necessary.

By the installation of low pressure turbo-generators with condensers and cooling towers and the installation of low pressure turbo-blowers with condensers and cooling towers at the blast furnace blowing engine house, two boiler plants have been dismantled, another at the local pumping station only operates occasionally, and

FIG. 1—TURBO-EXHAUSTERS OPERATED BY TENNESSEE COAL, IRON & RAILROAD CO.

Portions of a paper read at the Birmingham meeting of the American Iron and Steel Institute, Oct. 29, 1914. The author F. G. Cutler, is chief of the bureau of steam engineering, Tennessee Coal, Iron & Railroad Co., Ensley, Ala.

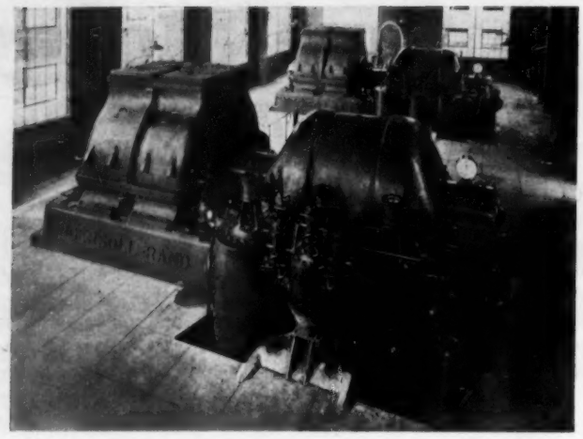


FIG. 2—INGERSOLL-RAND TURBO BLOWERS

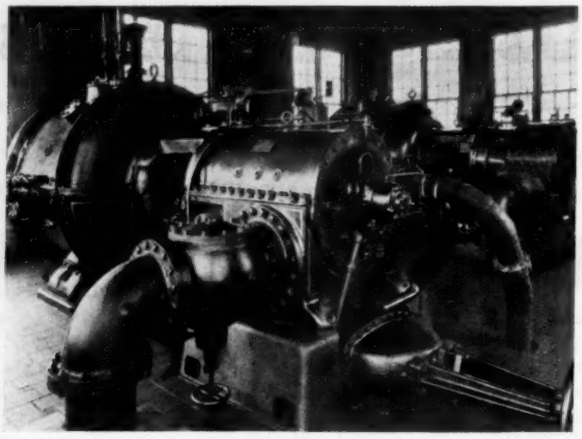


FIG. 3—TURBINE DRIVEN GAS BLOWERS IN BOOSTER STATION

two more at the steel plant are only operated during the time the mills are rolling, being shut down over Sunday, during which period the furnace boilers supply all the steam. Also all electric power is supplied for the operation of the American Steel & Wire plant at Fairfield; the by-product plant of the company at Fairfield and all electric power required for operation of seven coal mines of the company in the neighborhood of Ensley, resulting in the shutting down of several boiler plants and reduction in load of others. Besides this, a street railway line is also supplied with all the power required for the operation of 25 cars on 32 miles of single track.

This has been accompanied by an increase of product and a reduction in coal consumption, and the general result can probably be best shown by the statement that the saving in coal with present equipment and methods of operating over former practice is estimated to be at the rate of 200,000 tons per annum.

Inasmuch as this is perhaps the largest equipment of low pressure turbines in a steel plant in the country, it will be in order to briefly describe the equipment and discuss the results obtained.

In the No. 2 power house adjacent to the rail mill are three 3,000-kilowatt, 25-cycle, 3-phase, 6,600-volt generators operating at 1,500 revolutions per minute and driven by mixed pressure turbines which are supplied with exhaust steam through five regenerators each 8 feet diameter by 50 feet long from two 55 x 66-inch twin reversing engines, one driving the 44-inch blooming mill and one driving the 34-inch roughing rolls, and a 52 x 72-inch corliss engine driving the 28-inch finishing rolls. Steam from the pressure pumps and air compressor (after the feed water heaters are supplied) is also utilized for power.

The capacity of these regenerators is sufficient to absorb the extreme fluctuations in steam delivery as evidenced by the fact that under certain power conditions requiring the use of all available low pressure steam, there will be no loss of exhaust steam at the back pressure valves over long periods. This is accomplished without raising the back pressure on the engines over about four pounds. The 44-inch mill is one of the fastest blooming mills in the country, having a 24-hour record of 2,848 tons and a monthly record of 61,184 tons, both of these records being made in April, 1913.

The diagrams given herewith (see Fig. 6) were obtained by a special recording apparatus consisting of a

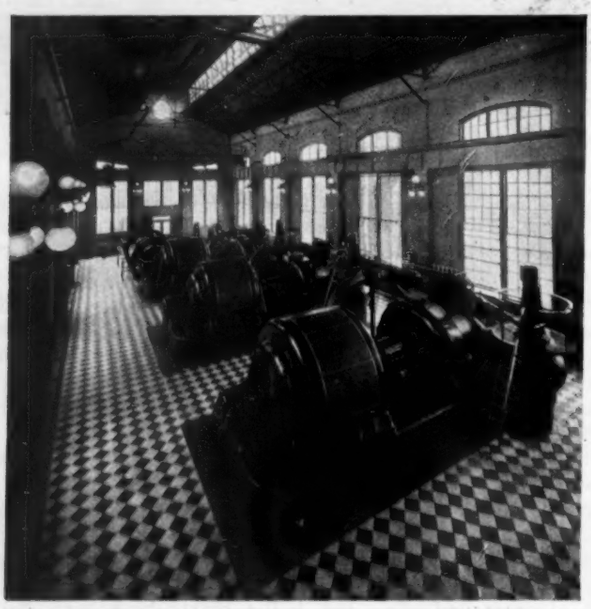


FIG. 4—THREE 3,000-KILOWATT LOW PRESSURE TURBO GENERATORS

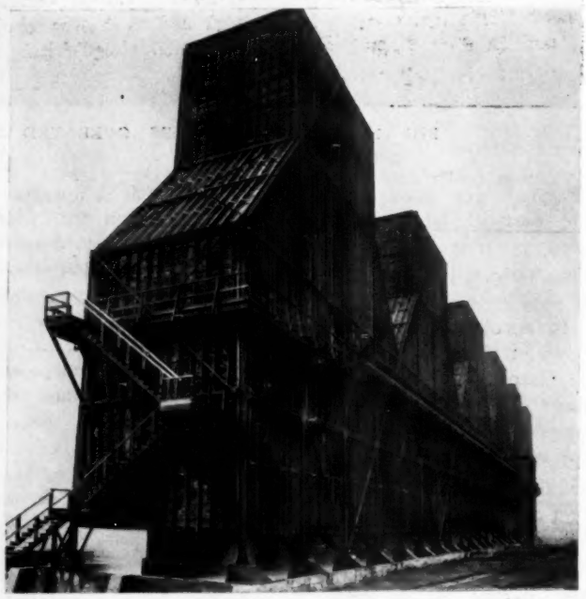


FIG. 5—COOLING TOWER WITH CAPACITY OF 18,000 GALLONS PER MINUTE

chart moved by a small motor at constant speed using three steam indicators with light spring, one showing the variation in pressure in the exhaust line from the engines leading to the regenerators, a second connected to the regenerator steam space, and the third connected to the low pressure supply line to the turbines, the relief valve on the regenerator blowing at about four pounds gage. The top diagram was obtained when the mill was rolling rails at maximum rate, the middle diagram when only the two reversing engines were operating and the lower diagram when the mills were starting up after a shut-down period. The wave-like fluctuations in pressure in the turbine supply line to the left each show the effect of one pass in the blooming mill.

*Turbo-Blowers at the Blast Furnaces*

The turbo-blower equipment at the blast furnaces is situated in two blowing engine houses, two mixed pressure turbo-blowers each of 55,000 cubic feet per minute capacity being located in a new building adjacent to the No. 1 blowing engine house, taking exhaust steam from 16 long crosshead type vertical reciprocating blowing engines, the air tubs of which have corliss inlet valves and poppet discharge valves and one mixed pressure turbine-driven blower of 45,000 cubic feet per minute capacity located in No. 2 blowing engine house, taking steam from seven similar blowing engines. The last-mentioned turbo-blower was originally a high-pressure turbine-driven machine, located temporarily outside the same building and was put into operation during December, 1912, on No. 4 blast furnace (of 350 tons nominal capacity) which had just been relined. The operation of this furnace for the year 1913 with respect to apparent blast conditions, as shown by the accompanying graphical tabulation of records, is interesting (see Fig. 7).

In this compilation the blast delivery of the turbo-blower was obtained by recording the average setting of the scale beam on the constant volume governor, by which the speed of the turbine is controlled, and the delivery of the engines was obtained by using a figure of 365 cubic feet of air per revolution of an 84 by 60-inch tub, the displacement of which was 383 cubic feet, this figure making an allowance of about 5 per cent for induction loss and expansion of air in the clearance, this being the apparent delivery as derived from a number of indicator cards. No allowance was made for leakage in the cold blast line, stoves or furnace. As No. 4 furnace was blown through a new double riveted cold blast line and the stoves and furnace had just been repaired, the leakage in furnace connections during this period was believed to be small.

The ratio of the blast delivered by the engine (or blower) to the furnace per pound of coke burned, is used by blast furnace men as an indication of furnace and engine leakage, since with the same burden and coke quality any increase in apparent blast generally indicates leakage and it is usually considered that it takes about 50 cubic feet blast in the furnace to burn one pound of coke, this figure varying somewhat with the burden.

By the examination of the graphical log of operation of No. 4 furnace a great difference in this figure for blower operation and engine operation is apparent, and in order to reconcile the apparent discrepancy a series of tests was made during the latter part of 1913 to determine the actual delivery of the blower. Some of the difference was found to be due to an accumulation of dirt on the constant volume governor which increased its weight; thereby changing the effective setting of the scale beam. The tests were made by disconnecting the blower from the blast line and installing one nozzle of 11¼ inches nominal diameter on the discharge of the blower and one nozzle 24 inches nominal diameter on the suction pipe of the blower.

After changing the calibration of the scale to agree with the nozzle test the turbo blower was put back on the furnace. The average operating records for a period of fifteen days prior to and for fifteen days after putting the turbo blower back on the furnace are given below:

| | October 23 to November 6, Inclusive. | November 8 to November 22, Inclusive. |
|---|---|---|
| Furnace blown by | Engines | Blower |
| Average product | 344 | 321 |
| Cu. ft. of blast per minute | 52,445 | 40,700 |
| Blast pressure | 13.50 | 17.85 |
| Pounds coke consumed per 24 hours | 1,036,000 | 951,000 |
| Cu. ft. blast per pound coke | 70.5 | 59.5 |
| Pound coke per ton product | 3,012 | 2,952 |

Since the furnace conditions were not appreciably changed it will be seen from the above that the equivalent delivery of the blowing engines per revolution was about $\frac{59.5}{70.5} \times 365$ = 307.5 cubic feet, indicating an efficiency of delivery of the tubs of 84.4 per cent or, since the displacement of the air tub was 383 cubic feet per revolution, the ratio of the actual delivery to displacement was about 80.2 per cent.

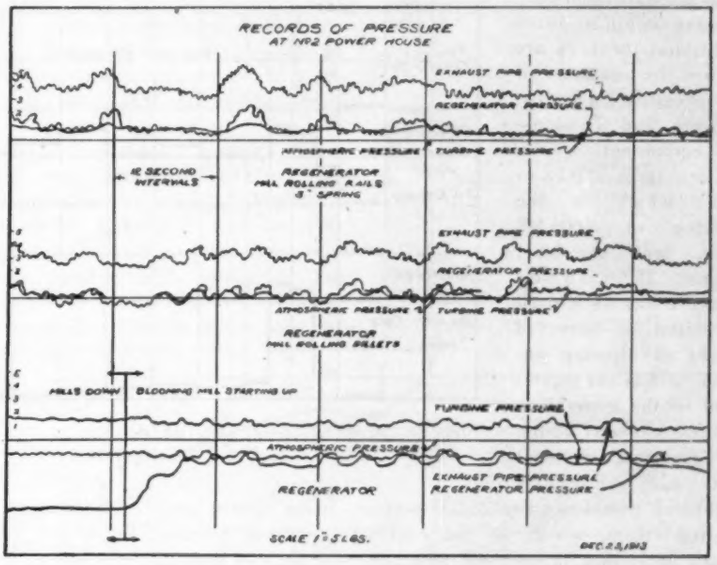



FIG. 6—RECORDS OF PRESSURE

*Over 90 Per Cent*

With blowing engines operating non-condensing as was formerly the case at Ensley, a 30 per cent saving in steam prime movers was made by condensing; and by operating the same engines non-condensing, and utilizing the exhaust steam in low pressure turbo blowers, a gross saving over original non-condensing condi-

tions of about 93 per cent was made; making the saving by installation of turbo blowers over condensing operation about 48 per cent. Local conditions requiring the use of cooling towers modify these figures somewhat, although the relative saving is not greatly different.

For an average vacuum of 27.3 inches the actual blast delivery is practically double that of the non-condensing engines. In other words, from the steam used to blow three blast furnaces with high-pressure non-condensing engines, three additional furnaces are blown by means of low-pressure turbo-blowers and condensing equipment.

The term "blast unit" which is the blowing of 1,606,140 cubic feet of blast against 15 pounds pressure has been used as a unit of delivered power of blowing engines, and is the equivalent of the generation of 1,000 kilowatt hours. To generate a blast unit with Ensley apparatus would require 25,000 pounds of live steam, which, at the cost of steam, including labor, coal and credit for gas, of about 10 cents per 1,000 pounds, represents a cost per blast unit of $2.50, and is equivalent to a steam cost of one-quarter of a cent per kilowatt hour.

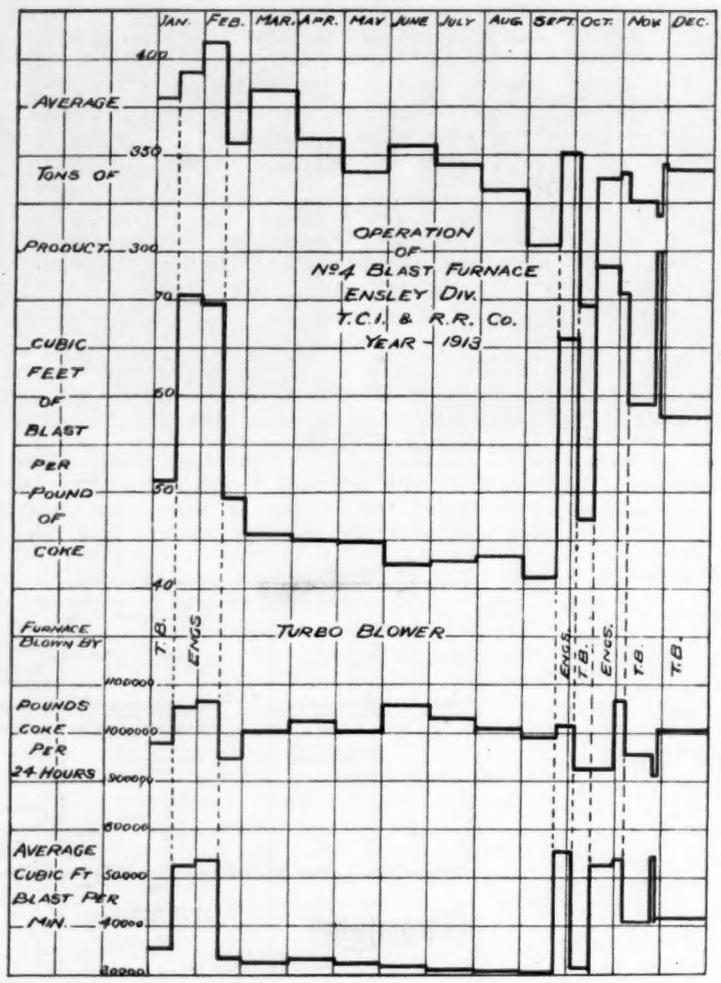

JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
AVERAGE TONS OF PRODUCT
CUBIC FEET OF BLAST PER POUND OF COKE
FURNACE BLOWN BY
POUNDS COKE PER 24 HOURS
AVERAGE CUBIC FT BLAST PER MIN.
OPERATION OF No. 4 BLAST FURNACE ENSLEY DIV. T.C.I. & R.R. CO. YEAR - 1913
TURBO BLOWER
T.B.
ENGS.

FIG. 7—SHOWING OPERATIONS OF NO. 4 ENSLEY BLAST FURNACE DURING 1913

By the original method of blowing these furnaces by non-condensing engines 48,180 pounds of live steam were required per blast unit on the same basis. It should be noted here that these figures are for actual blast and for comparison with usual figures for displacement measurement, would have to be reduced from 10 to 15 per cent.

Also by the operation of these blowers we have been able to put more reciprocating blowing engines on other furnaces, thereby materially reducing the cost of repairs by operation at lower speed. One man operates one blower ordinarily having nothing to do but to check the furnaces on signal by operation of a small hand wheel. The total blowing cost is materially lower.

It is reasonable to believe that the ability to maintain the volume of air supplied to the blast furnace constant would tend to more regular and consequently more economical operation, but so far as has been definitely determined by us, there has been no great difference in the operation of blast furnaces by means of turbo-blowers as compared with reciprocating engines, with the exception that after a stop or check on the furnace, full delivery is obtained more quickly than with engines. The operation of

(*Continued on page* 840b)

# Using Turbines to Save Money

## A DISCUSSION BY ALEXANDER L HOERR

FOLLOWING a description of the low pressure turbine and cooling tower installations and of the accompanying extension of electric power supply lines, the statement is made in the paper that "this has been accompanied by an increase in product and a reduction in coal consumption * * * estimated to be at the rate of 200,000 tons of coal per annum." This is a most remarkable saving and very creditable to those responsible for it. The writer, however, questions the completeness of the statement of the causes of this saving and questions the possibility of such a saving through the installation of low pressure turbines alone.

To secure more power from the same fuel through the use of low pressure turbines is entirely possible, but to secure so much more power from so much less fuel does not seem possible. The saving must be to some extent due to collateral fuel improvements, such as the connecting of boiler houses by steam mains, the substitution of coke oven gas for coal, improvement in the pumping situation, substitution of motors or turbines for small inefficient engines or similar changes.

The writer does not wish to minimize the value of the low pressure turbine as applied to non-condensing engine equipment, but rather to avoid claiming too much and causing disappointment and prejudice against the turbine when it fails to meet the claims made.

The combination of engines and turbines in the two power houses is al-

(*Continued on page* 840b)

Mr. Hoerr is steam and hydraulic engineer of the National Tube Co. at McKeesport, Pa.

# Figures on Steel Consumption

## Results of an Investigation Showing Consumption of Steel in Northern Ohio and Parts of Pennsylvania and Michigan

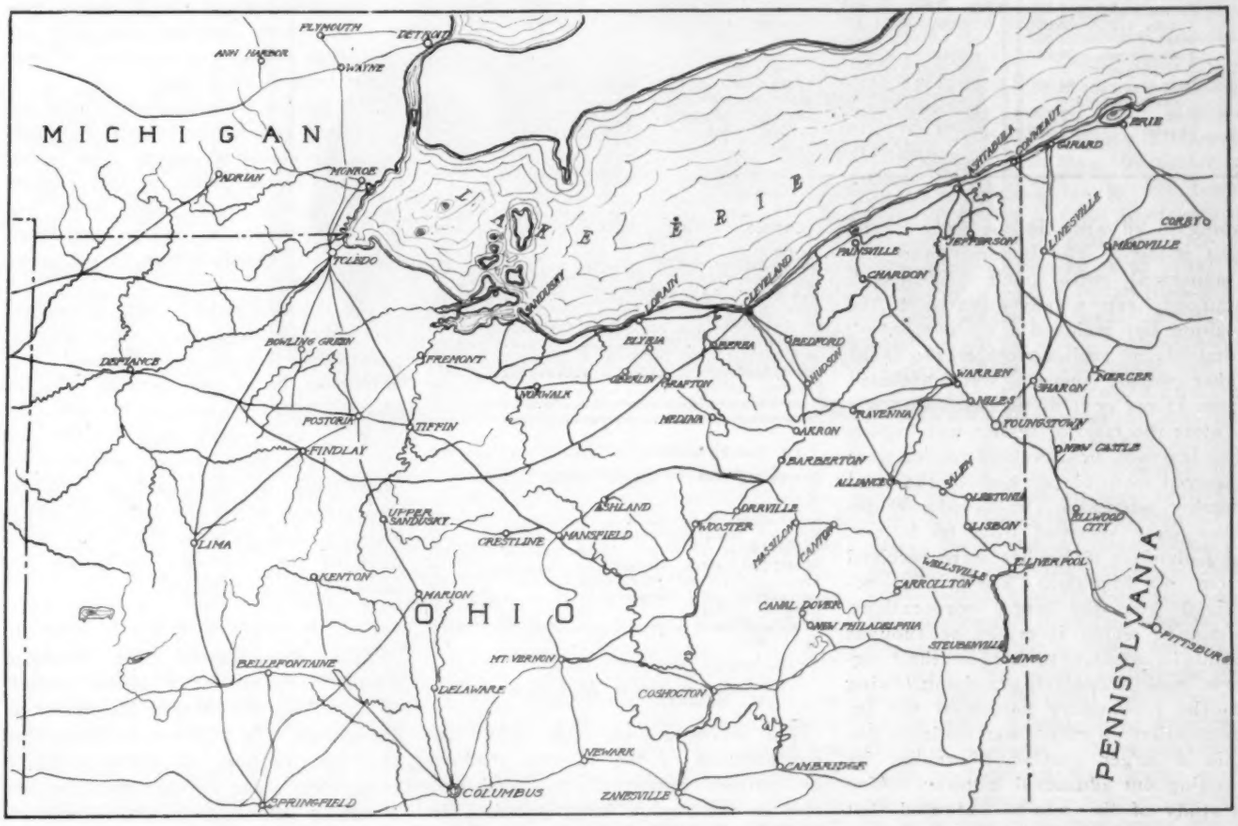
ACCURATE statistics giving the production of iron and steel products in the United States are available and figures showing the production in various sections of the country also are obtainable. In the long run, of course, production and consumption are practically equal, the only exception being that due allowance must be made for imports and exports. Estimates of the consumption of iron and steel products in the United States, therefore, can be made by combining the production figures with those covering imports and exports. Such figures, however, when obtained, cover the entire country and do not show the consumption of various products in the different sections of the country and in the important cities, towns and industrial centers. No statistics covering this phase of the situation are available, although they would be very valuable to the trade.

In an effort to demonstrate that it is possible to obtain statistics showing the consumption of iron and steel products in specific locations throughout the country and also to ascertain the actual consumption of certain steel products in the highly important industrial region bordering on Lake Erie and the Detroit river, THE IRON TRADE REVIEW made an investigation and compiled the figures which are presented in this article. The figures were collected entirely by mail and the responses were gratifying.

The object of the investigation was to obtain figures showing the consumption of finished and semi-finished steel by manufacturers. Agricultural consumption of such products as wire, sheets, pipe, etc., was not included and railroad consumption was also eliminated. The inquiries were directed entirely to manufacturers who use iron and steel products. The territory covered included all of Ohio north of a line drawn through Steubenville and Columbus, together with the southeastern corner of Michigan bordering on Lake Erie and the Detroit river, and the northwestern portion of Pennsylvania bordering on Lake Erie and north of New Castle and Franklin. This includes one of the most prolific manufacturing territories in the United States, where, as the figures which have been compiled indicate, enormous quantities of iron and steel products are used annually. The accompanying map shows the territory covered and the principal towns and cities investigated. The points in Ohio included in the investigation are as follows:

| | |
|---|---|
| Akron | Leetonia |
| Alliance | Lima |
| Ashland | Lisbon |
| Ashtabula | Lorain |
| Barberton | Mansfield |
| Bedford | Marion |
| Bellefontaine | Massillon |
| Berea | Medina |
| Bowling Green | Mingo |
| Cambridge | Mt. Vernon |
| Canal Dover | Newark |
| Canton | New Philadelphia |
| Carrollton | Niles |
| Chardon | Norwalk |
| Cleveland | Oberlin |
| Columbus | Orrville |
| Conneaut | Painesville |
| Coshocton | Ravenna, |
| Crestline | Salem |
| Defiance | Sandusky |
| Delaware | Springfield |
| East Liverpool | Steubenville |
| Elyria | Tiffin |
| Findlay | Toledo |
| Fostoria | Upper Sandusky |
| Freemont | Warren |
| Grafton | Wellsville |
| Hudson | Wooster |
| Jefferson, | Youngstown |
| Kenton | Zanesville |

Altogether, the investigation includ-




MAP SHOWING TERRITORY COVERED IN INVESTIGATION OF CONSUMPTION OF STEEL PRODUCTS

ed sixty towns in Ohio. In addition, the following towns in Pennsylvania were investigated:

| | |
|---|---|
| Corry | Meadville |
| Ellwood City | Mercer |
| Erie | New Castle |
| Girard | Sharon |
| Linesville | |

Also the following cities in Michigan were investigated:

| | |
|---|---|
| Adrian | Monroe |
| Ann Arbor | Plymouth |
| Detroit | Wayne |

The figures obtained cover the consumption of ten important steel products embracing soft steel bars, rerolled hard steel bars, structural shapes, steel sheets not galvanized, galvanized steel sheets, rolling billets, forging billets, merchants pipe, plain steel wire and steel plates.

The list of names to which the inquiries were sent was carefully compiled and checked up against Dun's and Bradstreet's directories. Small concerns with a rating of less than $10,000 were eliminated. Two sets of letters were sent out, the second set going to all who did not reply to the first inquiry. The inquiries were accompanied with self - addressed, stamped, return envelopes and the mailing list included 1,360 names. A total of 750 replies were received. In other words, answers were obtained from 55 per cent of the list. In some centers the ratio of replies was higher. For instance, in Cleveland replies were received from 61 per cent of the total number addressed; in Toledo 40 replies were received from 66 letters; in Columbus 60 replies were received from 103 inquiries. The replies received from the larger corporations, some of whom it might be thought would be reluctant to give out their figures, were particularly gratifying. Owing to the preliminary nature of the investigation no effort was made to obtain a larger number of replies by sending out additional inquiries. Also a study of the returns indicated that in most cases they included the larger proportion of the tonnage consumed. By analyzing the replies which were received, it was possible to make a close estimate of the total consumption in the various centers investigated. The aggregate figures for the whole territory covered are as follows:

| | Gross tons |
|---|---|
| Soft steel bars | 565,000 |
| Rerolled hard steel bars | 91,600 |
| Steel plates | 177,700 |
| Structural shapes | 78,810 |
| Steel sheets, not galvanized | 106,750 |
| Galvanized steel sheets | 76 350 |
| Rolling billets | 42,700 |
| Forging billets | 64,800 |
| Merchants pipe | 27,430 |
| Steel wire | 95,800 |
| Total | 1,326,940 |

The figures for northern Ohio are as follows:

| | Tons |
|---|---|
| Soft steel bars | 445,000 |
| Hard steel bars rerolled | 80,800 |
| Steel plates | 87,400 |
| Structural shapes | 54,000 |
| Steel sheets, not galvanized | 65 300 |
| Galvanized steel sheets | 69,500 |
| Rolling billets | 42,700 |
| Forging billets | 13,700 |
| Iron and steel pipe | 11,730 |
| Steel wire | 82,900 |

In southeastern Michigan the consumption is as follows, including Detroit:

| | Tons |
|---|---|
| Soft steel bars | 84,500 |
| Rerolled hard steel bars | 9,640 |
| Steel plates | 16,200 |
| Structural steel shapes | 20,000 |
| Steel sheets, not galvanized | 40 050 |
| Galvanized steel sheets | 5,850 |
| Forging billets | 51,000 |
| Iron and steel pipe | 11,650 |
| Steel wire | 12,200 |

In northwestern Pennsylvania, the consumption is as follows:

| | Tons |
|---|---|
| Soft steel bars | 35,500 |
| Rerolled hard steel bars | 1,260 |
| Steel plates | 7 400 |
| Structural steel shapes | 4,810 |
| Steel sheets, not galvanized | 1,400 |
| Galvanized steel sheets | 1,000 |
| Forging billets | 100 |
| Iron and steel pipe | 4,050 |
| Steel wire | 700 |

*Consumption in Cities*

The accompanying table shows the consumption of the various products in fourteen important industrial centers in the region investigated. The figures indicate the pre-eminence of Cleveland as a manufacturing center, where, owing to the great diversity of industry, large quantities of all kinds of iron and steel products are consumed. The consumption of bars is particularly heavy, aggregating 151,000 gross tons per year. The consumption of rolling and forging billets also is heavy. As a whole, however, the figures show comparatively light consumption of rolling billets, owing to the fact that most users of this material have their own steel plants. There are some particularly large consumers in the Cleveland district. One company reported a consumption of 41,314 tons of soft steel bars in 1913, and several companies reported consumptions of from 5,000 to 7,000 tons of bars. Other heavy bar consumers are found in the Youngstown district where one concern reported 15,000 tons, and in Columbus, where two concerns reported 16,000 tons.

The figures from Detroit are particularly interesting in that they show the purchasing power of the automobile manufacturers. The heavy consumption of forging billets, amounting to over 50,000 tons, is noteworthy. This is due to the large number of shops in Detroit specializing on automobile axles and other heavy drop forge work. The automobile body builders in Detroit consume over 37,000 tons sheets per annum, and over 84,000 tons of bars are also demanded by the industries in the Michigan metropolis. One Detroit company reported an annual consumption of over 34,000 tons of steel bars.

The figures from the few towns investigated in northwestern Pennsylvania are also interesting. The heavy consumption of plates in this region, amounting to over 39,000 tons per year in Sharon, is due to the large number of manufacturers of oil tanks and boilers.

The figures which are presented herewith, although they cover a comparatively limited area, would undoubtedly, be of considerable value in planning sales campaigns, inasmuch as they indicate with considerable accuracy just how the consumption is distributed in the various centers. This affords a definite basis on which to work and relieves the sales manager of the necessity for firing his ammunition at random.

CONSUMPTION OF STEEL PRODUCTS IN VARIOUS CITIES

| Town. | Soft steel bars. | Hard Steel bars re-rolled. | Steel plates. | Structural shapes. | Sheets not galvanized. | Galvanized sheets. | Rolling billets. | Forging billets. | Iron and steel pipe. | Steel wire (plain). |
|---|---|---|---|---|---|---|---|---|---|---|
| Ohio:— | | | | | | | | | | |
| Akron | 750 | 54 | 1,640 | 7,210 | 635 | 3,000 | ..... | 5 | 96 | 300 |
| Canton | 13,910 | 314 | 2,960 | 1,720 | 8,670 | 7,220 | ..... | ..... | 95 | 57 |
| Cleveland | 151,000 | 15,460 | 31,850 | 14,200 | 8,680 | 12,000 | 28,500 | 10,500 | 1,810 | 54,200 |
| Columbus | 23,640 | 483 | 172 | 5,475 | 880 | 1,180 | ..... | ..... | 1,950 | 11,180 |
| Lima | 1,200 | ..... | 5,040 | 3,755 | 375 | 34 | ..... | 1,650 | 385 | 27 |
| Niles | 45,343 | 95 | 12,000 | 478 | 8,053 | 6,505 | ..... | ..... | 27 | 100 |
| Sandusky | 575 | 27 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Springfield | 12,120 | 1,800 | 1,070 | 4,580 | 156 | 179 | ..... | 410 | 320 | 270 |
| Toledo | 28,000 | 925 | 4,550 | 1,230 | 4,620 | 1,465 | ..... | 717 | 2,080 | 1,450 |
| Warren | 180 | 32 | ..... | 72 | 650 | 955 | 7,250 | 10 | 492 | 51 |
| Youngstown | 20,050 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Michigan:— | | | | | | | | | | |
| Detroit | 84,300 | 9,550 | 16,200 | 19,700 | 37,500 | 5,450 | ..... | 50,800 | 11,600 | 12,180 |
| Pennsylvania:— | | | | | | | | | | |
| Erie | 28,800 | 765 | 2,380 | 1,190 | 893 | 18 | ..... | 10 | 3,320 | 783 |
| Sharon | 460 | ..... | 59,000 | 3,000 | 231 | 690 | ..... | ..... | 312 | 45 |

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"Air Compressors and Vacuum Pumps" is the title of a bulletin recently issued by the Mesta Machine Co., Pittsburgh. In addition to describing the construction of these machine completely, the bulletin contains interesting indicator diagrams and efficiency cards.

# Iron, Steel and Coal in Dixie---I

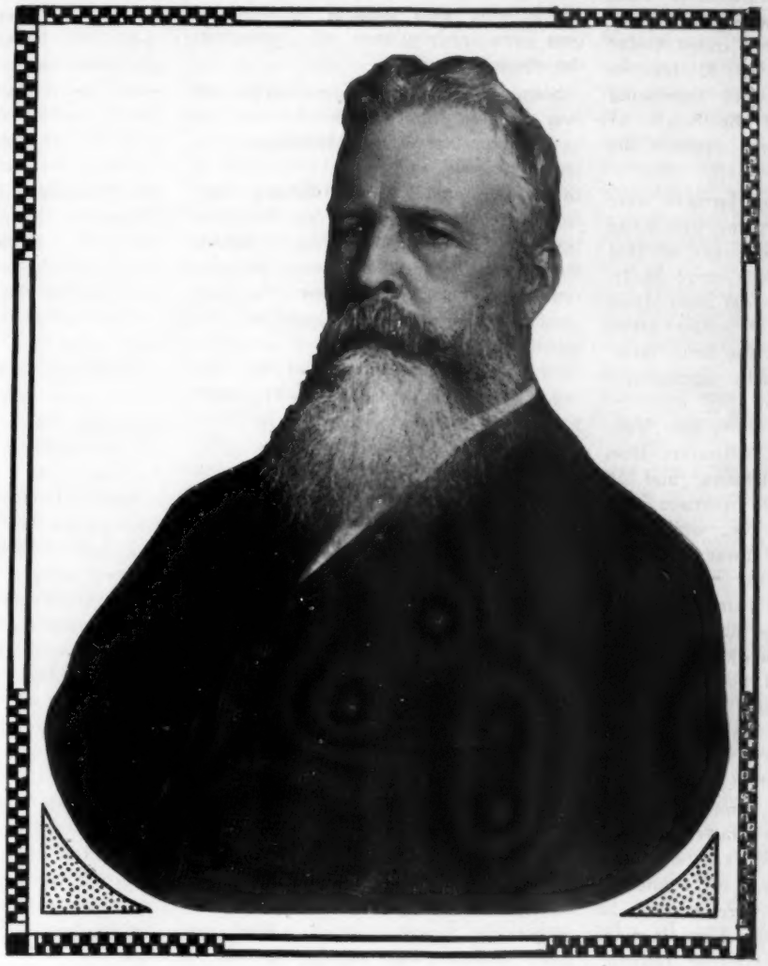
## A Graphic Summary of the Growth of the Iron and Steel Industry in the South Covering the Period from 1700 to 1893

BY JAMES BOWRON

AT the outset, my difficulty is to define "The South." Politically and historically, it should embrace the states south of the Mason and Dixon's line and east of the Mississippi, but metallurgically, we may dismiss from that category the states of Florida, Mississippi and Louisiana.

Again, the definition of the south may vary chronologically, for the metallurgical south of the ante-bellum period was much more extensive that the metallurgical south of today.

Before the war there was no iron and steel industry in the south based upon the manufacture of iron with mineral fuel. The records point to the location throughout the southern states of small charcoal furnaces to which bloomaries were frequently attached. These charcoal furnaces were sometimes blown from one tuyere with a wooden blowing tubs operated by water wheels. Some of these furnaces produced only one or two tons per day and the iron was largely worked up by local blacksmiths into horseshoes, wagon tires and harrow teeth. In east Tennessee, bar iron became a local currency and was considered as valuable a medium of exchange at the local stores as eggs and ginseng are today. It is even chronicled that preachers were once paid in bar iron, but this statement may be ironical. These water-blown and water-operated forges were irreverently called "thundergust" forges. In those days there were no railroads and no macadamized roads, and the early settlers had to be self-dependent and work out their own salvation in peace and war against somber forests, rugged mountains, and stealthy unrelenting Indians, with the iron of their own production. A community had to make iron as well as spin and weave clothing.



JAMES BOWRON
President, Gulf States Steel Co.

### *Where Ores are Found*

For such crude methods only the rich and easily smelted limonites were available. These prevail in a broad belt paralleling the Allegheny mountains and their subsidiary ridges through Virginia, east and middle Tennessee, northwest Georgia and northern Alabama. In Virginia and western North Carolina this belt of ores appears in a more massive form as fissure veins, and maintains the familiar condition of scattered gravelly deposits through the remaining states. Eminently treacherous as to continuity, they are more so as to analysis, and we have personally drawn samples over one field varying from 0.1 to 0.6 in phosphorus. The ease with which these brown ores could be smelted made them, however, attractive for the purpose, and the density of forests afforded a ready supply of charcoal fuel.

The industry appears to have crept southwestwardly with the gradual spread of population. In 1722 a furnace was started in Maryland near Chesapeake Bay, to utilize the ore on the property of George Washington's father; but we read that the English manager on arrival investigated the ore available, and could not find more "than will serve for one blast, if that". Many of the laborers seem to have been English convicts. In 1725 they appeared to be making progress, for they planned to put the forge on double shift so that it might work up to eight tons per week. A part of this furnace was still standing in 1840. In Virginia we learn that about 1716 some Germans came over under the auspices of Queen Anne "to make wine and help in the iron business." Some superintendents of iron and steel works in this day and generation will be interested to learn how and when began the ap-

A paper read at the Birmingham meeting of the American Iron and Steel Institute, Oct. 29, 1914. The author, James Bowron, is president of the Gulf States Steel Co., Birmingham.

parent affinity between iron workers and potable beverages. The first blast furnace located at Fredericksburg went out of blast because of the failure of sufficient corn to support the oxen who hauled away the product. The furnace made 20 tons per week. The blowing engines, or bellows, cost $500.00, and one of the ore mines was from 15 to 20 feet in depth.

In North Carolina we read of a furnace built in 1780, which was in operation down to 1873, and in South Carolina 1787 appears of record. The earliest furnace mentioned in Georgia was in 1832, and in Alabama in 1818, near Russellville, in what is now Franklin county. The plant was called Cedar Creek, being from 25 to 30 feet in diameter at the base, and narrowing into a smoke stack at the height of about 25 feet. This was operated by water power.

It is recorded that the farmers were glad to give the boulders of iron away to get them out of their way so that they might till their fields more easily. The fuel used was charcoal made from thousands of the finest cedar trees. These furnaces supplied the local farmers with cooking vessels, agricultural implements and bar iron.

In the meantime, Kentucky and Tennessee were closer to civilization than were Georgia and Alabama, and in 1791 Bourbon or Slate furnace was built near Owingsville, Ky., which had a production of about three tons per day. Castings and bar iron were hauled seven miles to Licking river and floated to Cincinnati and Louisville. It is recorded that the workmen digging ore had to be guarded by armed sentinels against Indians, and it was necessary to build a strong block house on the principal ore bank. In 1810 this furnace contracted with United States government to furnish cannon balls to the navy, and such material was actually used by General Jackson at the battle of New Orleans. In Tennessee a furnace and forge were erected in Sullivan county, near the Virginia line, about 1797. Some interesting illustrations of these old furnaces are to be found in "The Story of Coal and Iron in Alabama." Anyone traveling through the woods and finding one of these historical relics, unless he saw the slag beneath the weeds and brush heaps, might easily conclude he had run upon an abandoned lime kiln.

In the nature of things, with the growth of population and the development of roads, and more particularly with the construction of railroads, the iron trade began to lose its local character and assume its normal aspect as a national industry. In doing this it met with some legislative discouragements, so that we cannot altogether console ourselves by referring to "the good old days," for we find a plaintive petition presented to the General Assembly of Pennsylvania on Nov. 30, 1785, asking for an additional duty to be laid upon foreign bar iron was adversely reported by the committee, and not until the adoption of the Morrill tariff, 1861, did this industry obtain a really solid foundation. It is true that the number of establishments multiplied greatly, for prior to the civil war we find a record in the south of no less than 198 furnaces, 217 forges and bloomaries, and 30 rolling mills, the vast majority of which were then passing or about to pass into a condition of "innocuous desuetude."

Some of these plants, however, had been notable ones. Steamboat men can be found today on the Mississippi river and Ohio, who will speak with pride of the boilers made from Hillman's charcoal iron plates produced on the Cumberland river with brown ore, charcoal fuel, and the puddled blooms pounded out by a big trip hammer. Memory suggests that two negroes handling them under the hammer weighed over 250 pounds each. The success of the Hillman family in this Kentucky enterprise was a material factor in Birmingham developments later on. The charcoal furnaces from Rome, Ga., to Selma established a reputation for carwheel iron, the low silicon cold blast charcoal pig being soft at the hub, easily turned, but taking a deep chill. Among those producers one notices the rise of the Noble family at Anniston into affluence, laying the foundation for the future success and development of that city.

### *Period of the Civil War*

As a traveler passes by railway train through a tunnel from one landscape to another in a different valley, so we pass through the period of the civil war. Enterprise throughout the south was necessarily almost stopped. Here and there a plant was maintained for the purpose of furnishing war-like supplies —cannon, shot and swords; but more important still perhaps for military purposes were locomotives, wheels, rails, nails and bar iron. Establishments within range of Federal gunboats upon the rivers in some cases were injured or destroyed; in others, abandoned for the time. The organizations of peace were broken up, some plants taken by the Federal government and operated for its own benefit, including the coal mines which later became the foundation of the Tennessee Coal, Iron & Railroad Co. Suffice it in a paragraph to say that this was, as all war times are, a period not of construction, but of destruction.

There are 60 pages in "The Story of Coal and Iron in Alabama," by Ethel Armes, a most interesting and detailed description of the developments and struggles of the iron makers of Alabama during the four years in question. It is interesting to read how during this period shot and shells up to 180 pounds weight were cast for the Confederate government at Natchez, and later at Columbiana, Ala., the plant being burned in Wilson's raid of 1865. Guns were manufactured 10 to 18 feet in length, and from 2 to 3 feet in diameter through the breech, cast and strengthened with wrought iron bands. Armor produced here for Confederate gunboats was in the shape of narrow, thick strips, usually 6 x 2 or 6 x 3, and as much as 10 feet in length. Admiral Farragut said after the fight in Mobile Bay concerning the Confederate steamer Tennessee that he poured the "whole broadside (of the Hartford) of 9-inch solid shot within 10 feet, and not a shot entered the vessel." This certainly speaks well for the quality of the iron manufactured.

With the destruction of the older plants came the dawn of new things. Although Miss Armes says, speaking of the fall of Selma, "Beyond that burning city smoke the ruins of Oxmoor, Irondale, Tannehill, Brierfield, Shelby, and the rest, the coal and iron business of Alabama quieted now it seemed forever," but a resurrection day was coming very fast.

It is true that warm blast and higher pressure were being applied to charcoal furnaces, that the yield was steadily coming up and cost coming down, and the day was approaching when the enterprise of James C. Warner of Nashville, and L. S. Goodrich led to the construction of the largest charcoal furnaces yet known in the south, with kilns for the production of charcoal and the recovery of wood alcohol, but the days of the charcoal industry were fading fast and these efforts came too late.

In 1864 the first Bessemer steel was blown in this country, and in 1867, 3,000 tons of Bessemer ingots were produced; 1872, 120,000 tons; 1877, 560,000 tons, and in 1882, 1,696,000. As coming events cast their shadow before, it was increasingly evident that steel was about to displace charcoal iron, and the doom of many a small decadent southern furnace, bloomary and rolling mill was already apparent. About this time a new factor was introduced, mineral fuel in the shape of coke, and a new era commenced.

Becoming convinced that the red powder on Montevallo road was iron

ore, Mr. Grace, later sheriff of Jefferson county, owner of a farm at Grace's Gap, sent a wagon load of the ore to a forge in Bibb county, where it was made into wrought iron. He made the first iron from Red Mountain ore in 1862 from what is now the Ishkooda property of the Tennessee Coal, Iron & Railroad Co. The purchasers were F. Gilmer and Jno. T. Milner, who with aid from the Confederate government established Oxmoor furnace; and in later years purchased hundreds of acres from Mr. Thomas of Catasauqua. This formed the nucleus for the holdings of the Republic Iron & Steel Co. in Alabama.

In 1863 Daniel Hillman, who had made a handsome fortune from his Kentucky operations, visited the spot and invested in lands. These were afterwards opened by his son, T. T. Hillman, for account of the Alice Furnace Co. of Birmingham, in 1879, which began with an output of 53 tons per day; but this is anticipating. Towards 1870 plans were laid to rebuild the furnace at Oxmoor, accomplished in 1872, and at this point the financial assistance was obtained of Daniel Pratt, the cotton gin magnate, and his son-in-law, H. F. DeBardeleben, who was to become so active a figure in southern development. The furnace went into blast in the winter of 1873.

At that time the South & North railroad, now the Louisville & Nashville Railroad Co., had not succeeded in completing the railway, a 66-mile gap remaining unfinished between Decatur and Birmingham. There seemed great doubt as to whether money could be raised to complete this, and whether the road finally completed with the assistance of $2,200,000 from the State of Alabama would become only a feeder to the Alabama & Chattanooga railway; but after much negotiation the enterprise was completed and opened just as the panic of 1873 broke upon the country. The Oxmoor furnace could not get out more than ten tons per day. The price of iron fell from $40.00 to $8.00. The plant was shut down and cholera swept over the district. Again it might seem as though the iron industry in the south was doomed.

In the autumn of 1873 the Eureka Company was formed, which employed L. S. Goodrich as superintendent. He reduced the fuel consumption from 196 bushels of charcoal to 123, and increased the output of the furnace from eight tons per day to 18; and in the following year he proposed the use of coke instead of charcoal. After the lapse of some time, during which the officers of the company, swamped with debt, offered to turn over their furnaces to anyone who could handle them successfully, a meeting of citizens of the infant city of Birmingham raised an experimental fund, and five coke ovens were built.

Miss Armes graphically says, "Affairs on the North & South railroad were in sorry shape. There was neither coal, iron or lumber for the road to carry; neither were there passengers, for nobody ever went anywhere in Alabama in those days. Between Decatur and Calera there was not enough traffic to warrant the operation of a passenger coach one a week, nor to operate more than one freight car a day. There was no revenue from any source. The experiment of making iron with coke seemed to every man in the district the last straw. Every eye was turned to Oxmoor. If it were unsuccessful, then the South & North Railroad must be forever abandoned in Alabama."

On Feb. 28, 1876, the first coke pig iron was made in Alabama. As a result Louisville and Cincinnati interests, including the well-known names of Guthrie, Sloss and Sinton, became associated with the property. In 1876 and 1877 the furnaces were rebuilt 50 feet in height, making 20 to 25 tons each. And now set in a general era of development of coke using, hot blast furnaces.

New York capital constructed Rising Fawn furnace in Dade county, Georgia, the first blast furnace in America to which Whitwell hot blast stoves were attached, the first departure from the old system of cast iron pipe stoves. My friend Thomas Whitwell—at whose Thornaby furnace, about 1860, I saw gas taken off by a down-comer rising out of the center, while top fillers dumped barrows into the open hopper around it—was deeply impressed with the possibilities of the American iron trade, and in addition to establishing an agency for his stoves, he assumed the leadership in an enterprise known as the Southern States Coal, Iron & Land Co. With English capital the company built two furnaces in South Pittsburgh, Tenn. for the purpose of combining with navigable water the coke and coals of Cumberland mountain, and local red ores, and brown ores of East Tennessee. The first of these furnaces was blown in in May, 1879, having been constructed on English designs and erected and operated by English experts sent out for the purpose. It commenced with 45 tons per day output and crept up to about 70 tons under the management of my energetic colleague, E. C. Pechin. The furnaces were 70 feet high, 18 feet bosh, and 3½ pounds pressure of blast heated to 1,300 degrees.

This was by no means, however, the first development in coke-made pig iron in the state of Tennessee, for a short blast had been made experimentally in 1859 in a furnace afterwards used by the Union troops as a lime kiln. The first furnace actually built on a commercial scale for coke fuel in Tennessee, or in the south at large, was that at Rockwood, Tennessee, in 1867, of which Captain H. S. Chamberlain, of Chattanooga, was the leading spirit. This plant has always been successful and active, and is so today.

The successful manufacture of pig iron with coke at Oxmoor naturally led to developments on a constantly broadening scale. The next few years witnessed the construction of the Sloss furnace in Birmingham; and the Birmingham Rolling Mill Co., a Louisville enterprise, taking root in 1879 for the manufacture of bars, sheets and plates. These were followed by the location of the Woodward Iron Co. furnaces, established by Wheeling, W. Va., capital in 1881, which commenced operation in 1883.

About this time the well-known statistician, Robert P. Porter, director of the 11th census, and interested in the *New York Press,* visited the district and gathered together several interesting remarks and prophecies. Mr. Porter quotes among others the late Abram S. Hewitt, who said, "The region of Alabama . . . . is the only place on the American continent where it is possible to make iron in competition with the cheap iron of England. The cheapest place until now on the globe is the Cleveland Region, Yorkshire, England. The distance from the coal to the ore averages over 20 miles, while in Alabama the coal and the ore are in many places within half a mile of each other. I think this will become the region of coke-made iron on a grander scale than has ever been witnessed." Mr. (afterwards Sir) Isaac Lowthian Bell, a world-wide authority, said, "I will not say that Birmingham will furnish the world with iron, but I will say that she will eventually dictate to the world what the price of iron shall be." Mr. Porter, however, after quoting these two, and having selected Oxmoor as the cheapest possible point of production, says Willard Warner, former United States Senator, and experienced iron manufacturer, "admitted . . . . that there had been more capital sunk in Alabama than there had been dividends paid in the iron industry since the war." Samuel Noble, of Anniston, said, "You can go into the history of iron making in Alabama for the past 12 years and find it strewn with the wrecks of shattered hopes. In Georgia, if there is a single furnace in the state that for the past 12 years has not sunk the original owners all the money

they put in, and not changed hands, I do not know it. Those of Tennessee have not fared much better. . . . . The great trouble is we have not a home market. The whole state of Alabama cannot take the product of a single blast furnace for a month. The men who have gone into the iron business with a hope of making iron cheaper than England, and making nothing else, have lost their money."

About this time a remarkable real estate speculation developed throughout the south, which for some unknown reason was largely predicated upon the iron trade, and more particularly on the blast furnace department. Extraordinary scenes occurred of auction sales of lots, in forests of scrub pine, or even in bottom farm lands subject to overflow. Trains of Pullman cars were side-tracked bearing hundreds of eager bidders, largely prosperous Eastern business men who were willing to bid hundreds of dollars per front foot on the promise of a blast furnace at that point, although the lands had previously been worth a very few dollars per acre. Numerous furnaces were built in pursuance of this remarkable craze. In two instances, at Fort Payne, Ala., and Middlesborough, Ky., open-hearth steel plants were built at the same time.

*Necessity Enforced Improved Methods*

The multiplication of blast furnaces caused the inevitable result of bringing down the selling price of southern pig iron so low as to be largely unprofitable, and it began to be the study of each producer how he could reduce costs. This led to the building of larger furnaces and more careful preparation of the stock, and harder blowing, and 200 tons per furnace per day became the ideal to be attained.

This was accompanied by efforts to improve the quality of the fuel and reduce the consumption of coke and limestone. Various types of coal washers were introduced, including the Stutz, the Robinson-Ramsay, the Stewart, and others. The south took early part in experiments in the interest of economy and improvement, utilization of waste heat from coke ovens being effected by myself in 1879 at Victoria, Tenn., in raising steam from the fire brick works at that point, and by carrying the exhaust steam under the drying floor of the brick works. Some effort was also made to reduce the cost of brick for coke oven lining and the backing of blast furnaces by manufacturing them from local material in the Chattanooga district. A fair coke oven brick was made, but the clay bricks were not satisfactory owing to the large amount of combined water in the kaolin clay and the consequent shrinkage. The application of waste coke oven heat went ahead still more extensively under Mr. Erskine Ramsay at the Pratt mines near Birmingham, and Mr. Charles E. Bowron at Tracy City, Tenn., where all coal mine haulage from drift mines, operations at the tipple, distribution of coal to the ovens, and pumping of water was accomplished by this agency.

In developing these plans of cheaper and larger output the district began to gain outside skilled operators, evidenced when in addition to the companies already named, the Thomas family of Catasauqua, Pa., developed the Pioneer Mining & Manufacturing Co., near Birmingham, and gradually the Birmingham district became a hive of industry. Under the stress of competition, however, other furnaces and mills standing alone with old plants and equipment became obsolete and dropped either into the hands of their creditors or into idleness, and then disappeared from active competition. It is needless to compile a list of these tragedies in which many hopes were buried. It is kinder to draw a veil of oblivion and obscurity over them.

The business of the south, as some of these old rolling mills went out of existence, concentrated more and more upon the production of foundry and forge pig iron in the Birmingham and Chattanooga districts, in which competition Birmingham had the advantage owing to the greater area and mass of its red ore supply and the greater, and indeed unrivaled, propinquity of its ore, flux and fuel. For a time it was assumed that southern pig iron was worth at least a dollar per ton less than northern iron, because of its content of phosphorus. In 1879 the writer was assured by the leading stove manufacturer of St. Louis that he could not dream of putting such an inferior material into his cupola, but would only use Hanging Rock and Glengarnock.

A factor arose, however, very helpful to the south, namely, realization by the trade about 1889 of the effect of silicon in softening castings. It was found that using from 30 to 32 cwt. of coke with 12 per cent ash it was easy to make high silicon pig. The writer has seen what the English call "glazed" pig iron put back into the furnace to be remelted, as unmerchantable, but it was not very long before the southern high silicon, or "bright" iron, as we called it, worked its way into favor as a softener and scrap carrier, and the virtue of pig iron, high alike in phosphorus and silicon, gave it preference, for the production of stoves radiators and architectural castings.

Under the pressure of competition by the larger companies questions naturally arose of decreasing competition by combinations, thus increasing resources and decreasing the expense of supervision and of distribution. In 1879 negotiations for the purchase of the Tennessee Coal, Iron & Railroad Co. by the Southern States Coal, Iron & Land Co. were arrested by the lamented death in his rolling mill of Thomas Whitwell. He was chairman of the English company. This being followed up by the death of two leading stockholders, led to the reversal of the negotiations, and in 1882 the Tennessee Co. absorbed the Southern States Co. In 1886 the company extended its operations in Alabama and acquired the Pratt Coal & Iron Co., which had itself previously absorbed the Pratt Coal & Coke Co., the Alice Furnace Co., and the Linn Iron Works. In 1887 the company enlarged its operations by building the blast furnaces at Ensley, the most ambitious construction in the south up to that time and embracing four furnaces 80 feet by 20 feet, equipped with 12 Weimer blowing engines 84 inches, 36 inches, 54 inches, and 16 Whitwell stoves 65 feet by 20 feet. In 1892 this company enlarged further by the purchase of the DeBardeleben Coal & Iron Co., itself a combination embracing the Bessemer Iron & Steel Co., and the Little Belle Iron Co. Later in the same year it absorbed the Cahaba Coal Mining Co., which had itself previously acquired the Excelsior Mining Co. at Blocton, Ala. In 1899 the company bought a blast furnace plant at Sheffield, Ala., embracing three stacks, which purchase was subsequently relinquished.

*Entry of Republic Co.*

In 1899 the Republic Iron & Steel Co., which had assumed a commanding position in the north by the purchase and consolidation under one ownership of many rolling mills, extended its operations to the south by purchase of the mineral lands and blast furnaces of the Pioneer Mining & Manufacturing Co., the Birmingham Rolling Mill, and the Alabama Rolling Mill. The president of the last named, W. H. Hassinger, became district manager of the entire properties, and was ably backed by F. B. Keiser, with his Pennsylvania experience.

In 1887 new interests bringing New York and Richmond capital came into the Sloss Furnace Co., enlarged its capital and ownership of mineral lands, and built two additional furnaces in North Birmingham, presided over from 1888 to 1896 by Thomas Seddon. In 1899 the operations of this company

(*Continued on page* 825)

# Finding a Cause for Failure

## How the Microscope is Used to Show Up Defective Methods in Heat Treatment of Steel

BY OLIVER W STOREY

IT WAS not many years ago that the iron or steel works which possessed a chemical laboratory was the exception; now it is exceptional not to have one. During the period of establishment of the chemical laboratories in the iron and steel industry, a new science was being developed which was to supplement their work. Slowly and laboriously the equilibrium diagrams of various alloys were determined, but it was not until 1900 that Roozeboom published the iron-carbon diagram in substantially the same form as it is at present. With the equilibrium diagram in working order, the next step was its application to practice. Within a decade after the publication of the iron-carbon diagram the first microscopes were being used in the iron and steel industry to supplement the work of the chemist and now are considered invaluable.

Probably the greatest use for the microscope is in the determination of the proper heat treatment of iron and steel, but the determination of impurities in relation to the structure is also of importance. Although we may prescribe the proper heat treatment for a steel as a result of microscopic, chemical and mechanical tests, this does not insure proper workmanship. Any serious slip in the treatment of the steel will usually result in a failure, either in the physical tests or when the material is put in service. It is in these cases when the cause of failure must be determined of the steel that the microscope has an important use.

The first case to be considered was one where the materials were cast steels which had been annealed but failed during the physical tests. Microsections of the annealed material were made and are shown in Figs. 1, 2 and 3. The first glance at Fig. 1 would seem to show a fine grained steel. But a close study of the specimen and the photograph shows a coarse grained structure.

By closely examining the micrograph a continuous band of white ferrite may be traced which covers the central portion. It was persistent and could only be eliminated with prolonged annealing at a temperature higher than the normal after which the steel showed the proper ductility. The failure was due to improper annealing at a temperature that was slightly below the correct one.

In Figs. 2 and 3 the failure was due to two causes—ingotism and improper annealing. The ingotism was an important factor in determining the heat treatment necessary for this steel. In Fig. 2 coarse grains are visible again with the ferrite marking their boundaries. In Fig. 3 the structure of the outer portion of the casting is shown. Here the structure is marked by long parallel bands of ferrite extending the length of the micrograph. These bands are perpendicular to the surface of the casting and are a direct result of ingotism.

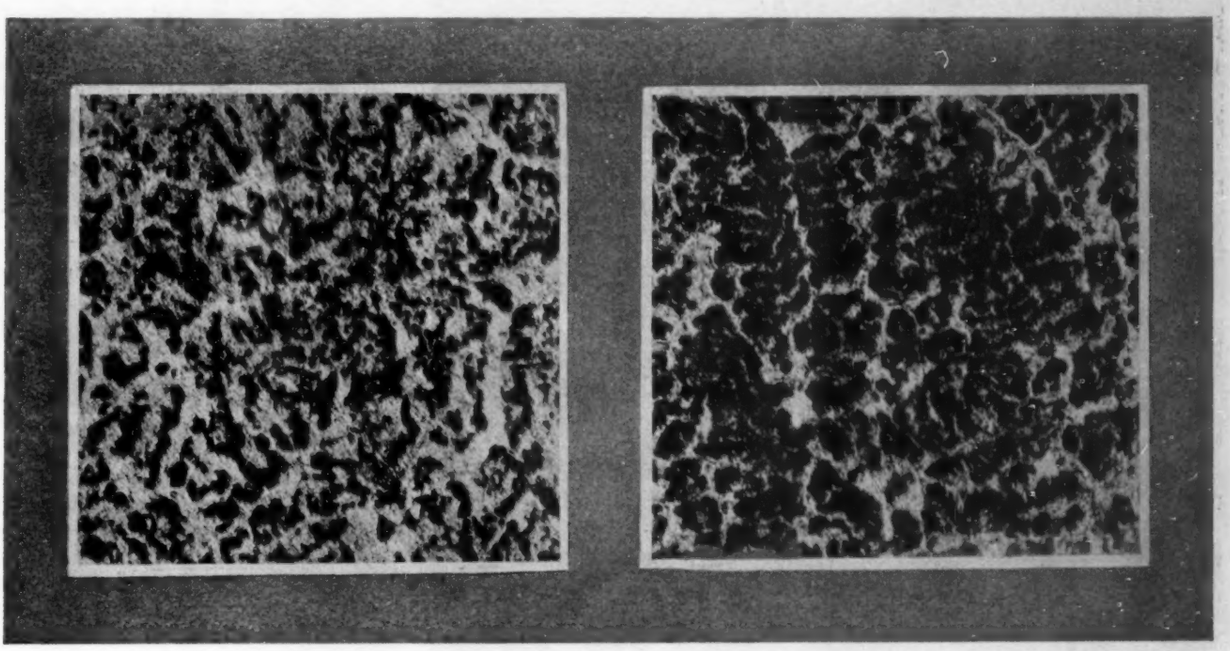


FIG. 1—CAST STEEL IMPROPERLY ANNEALED

FIG. 2—INGOTISM IN DEFECTIVE CAST STEEL

Though ingotism, as shown in Figs. 2 and 3, has been one of the causes of failure, a knowledge of the structure of the steel would have shown that a higher temperature anneal would have eliminated a large part of this trouble. The coarse grain of Fig. 2 would have been eliminated and that of Fig. 3 would have been reduced to a minimum.

In Fig. 5 is shown the fracture of a cast steel which was brittle even after annealing. This fracture showed ingotism to a marked degree. Upon examination with the microscope the structure of Fig. 4 was obtained and the first observation confirmed.

Ingotism is one of the several defects which occur in cast steel. By ingotism is usually meant the forma-

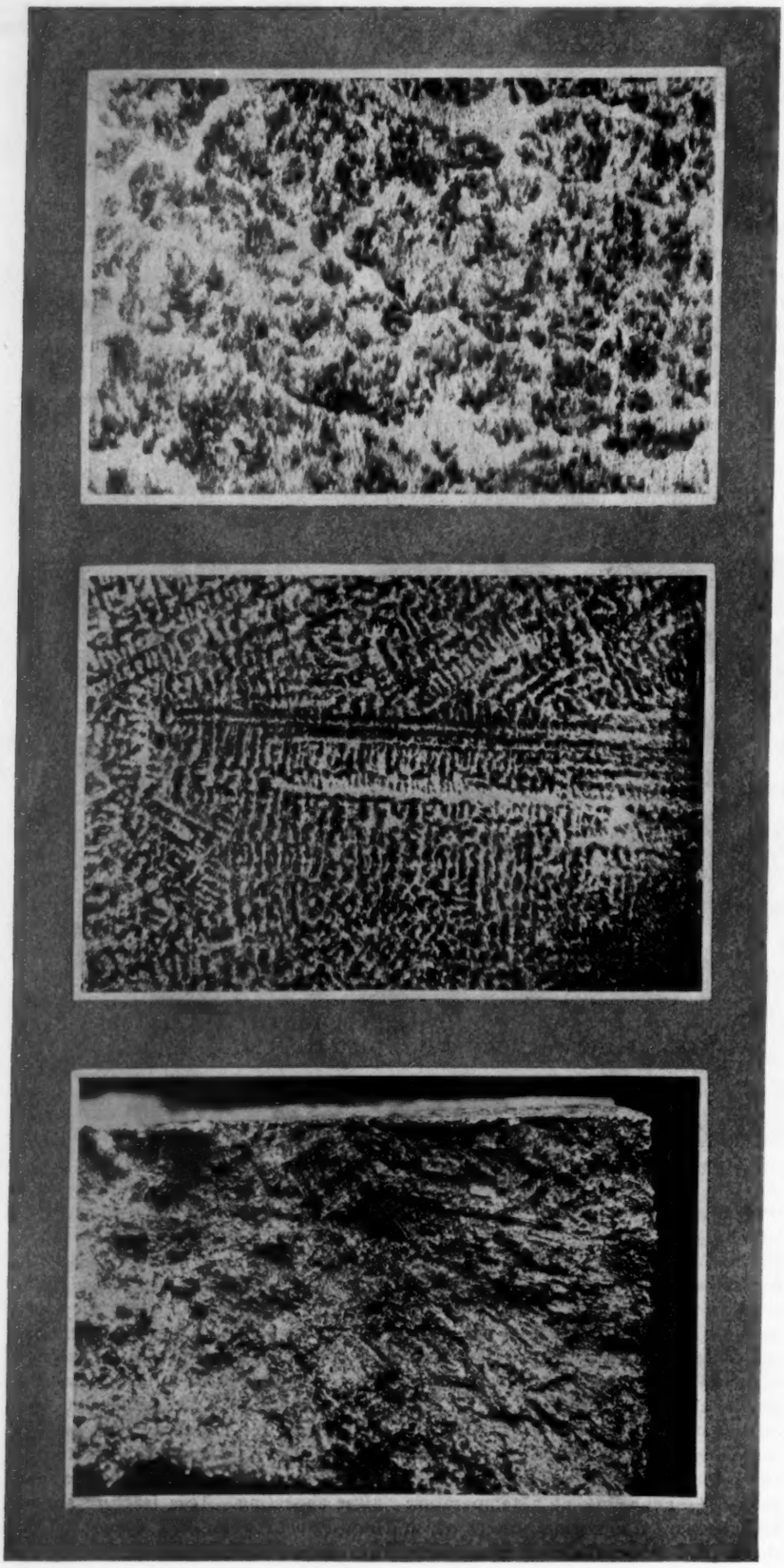


FIG. 3—LONG BANDS OF FERRITE IN OUTER PORTION OF CASTING SHOWN IN FIG. 2

FIG. 4—STRUCTURE OF BRITTLE CAST STEEL SHOWING LARGE DENDRITES

FIG. 5—FRACTURE OF BRITTLE CAST STEEL SHOWING HIGH DEGREE OF INGOTISM

tion of large crystals. When iron and steel or any metal freeze they crystallize and these crystals grow with great rapidity. If the passage through the solidification period is slow they will attain a large size. Ingotism is liable to occur mostly when a metal is cast at too high a temperature or if it cools at too slow a rate through the solidification period. When the steel is cast too hot it usually means a slow solidification owing to the heating of the molds due to the surplus heat. When a metal solidifies in a mold the first metal to freeze is that in contact with the mold. The metal freezes by means of dendrites which grow toward the center of the mass usually at right angles to the solidifying surface.

These dendrites, when the freezing is slow, grow to enormous sizes. In Fig. 5, where one-half of the specimen is shown, the direction of the dendrites is plainly seen. In Fig. 4 a dendrite nearly ¼ inch in length at the surface is shown. The remaining steel is also composed of various sized dendrites. Since large crystals do not adhere to one another firmly they always produce weakness and loss of ductility.

It is with difficulty that ingotism can be overcome, and it is doubtful whether the bad effects can be entirely overcome by annealing. In ingots this defect may be overcome by forging and rolling, but this remedy is not available in steel castings. But careful annealing will remedy the greater part of the trouble.

In Fig. 2 the dendritic structure is still visible though the casting was annealed and the white ferrite grain envelope is the remains of several dendrites. In Fig. 3 the long ferrite lines are the remains of the long dendrites shown in Fig. 4.

The specimen shown in Fig. 4 was annealed at various temperatures. By annealing at 900 degrees Fahr. the dendritic structure was still visible. Annealing at 950 degrees the structure had changed to an uniform area of ferrite and pearlite in the interior, but the structure at the edge similar to Fig. 3 could not be obliterated. Annealing at 1,000 and 1,075 degrees and double annealing could not eliminate the last of the ingotism at the edges. From this work it is evident that failure due to ingotism is a condition that must be remedied in the foundry and cannot be left entirely to the annealing.

Fig. 6 shows the microstructure of a defective piece of mild steel. A 20-inch mild steel pipe was heated and bent hot. All sections bent in this way burst when tested. The micro-

graph shows that the steel was overheated and shows the characteristic Widmanstatten structure. The pearlite has been rejected to the ferrite grain boundaries as large plates, causing brittleness. It was evident that the pipe was overheated for the bending operation. This steel was made tough and serviceable again by heating to 910 degrees. The long pearlite areas changed to small rounded areas.

Figs. 7 and 8 shows the structures of two defective locomotive axles. These axles were supposed to have been forged but the micrographs show little indication of such working. The chemical analyses showed that the steel was of excellent quality. Fig. 7 shows a coarse grain structure with large areas of pearlite surrounded by a net work of ferrite. The cause of the failure in this instance was due to poor heat treatment, probably the finishing temperature of the forging being high. This was not followed by the proper heat treatment. By annealing at 825 degrees a fine grained steel was obtained and the axle should have been given this treatment to render it tougher.

Fig. 8 also shows the microstructure of a forged axle, and this again failed owing to a coarse grain structure. This micrograph shows a structure somewhat different from that of Fig. 7. The grains are coarse as is evident from the continuous bands of ferrite. It will be seen that a fine structure is present inside of the coarse ferrite envelopes. It is probable that the forging was annealed, but at too low a temperature. The ferrite borders remain while the interior has become fine grained. By a slight increase in the annealing temperature the forging would have been properly annealed. The steel was annealed at 825 degrees and an excellent structure obtained.

The result of the examination of these typical cases of failure shows the importance of the microscope in the testing and chemical laboratory. In all of the cases discussed the chemical analyses showed that failure could not be attributed to poor quality, but a microscopic examination showed the cause of failure. This examination was made in a comparatively short time. Improper heat treatment is one of the most common causes of failure in steels and can be readily detected by microscopical methods.

The author wishes to thank the Northern Chemical Engineering Laboratories, of Madison, Wis., for their co-operation in the preparation of this article.

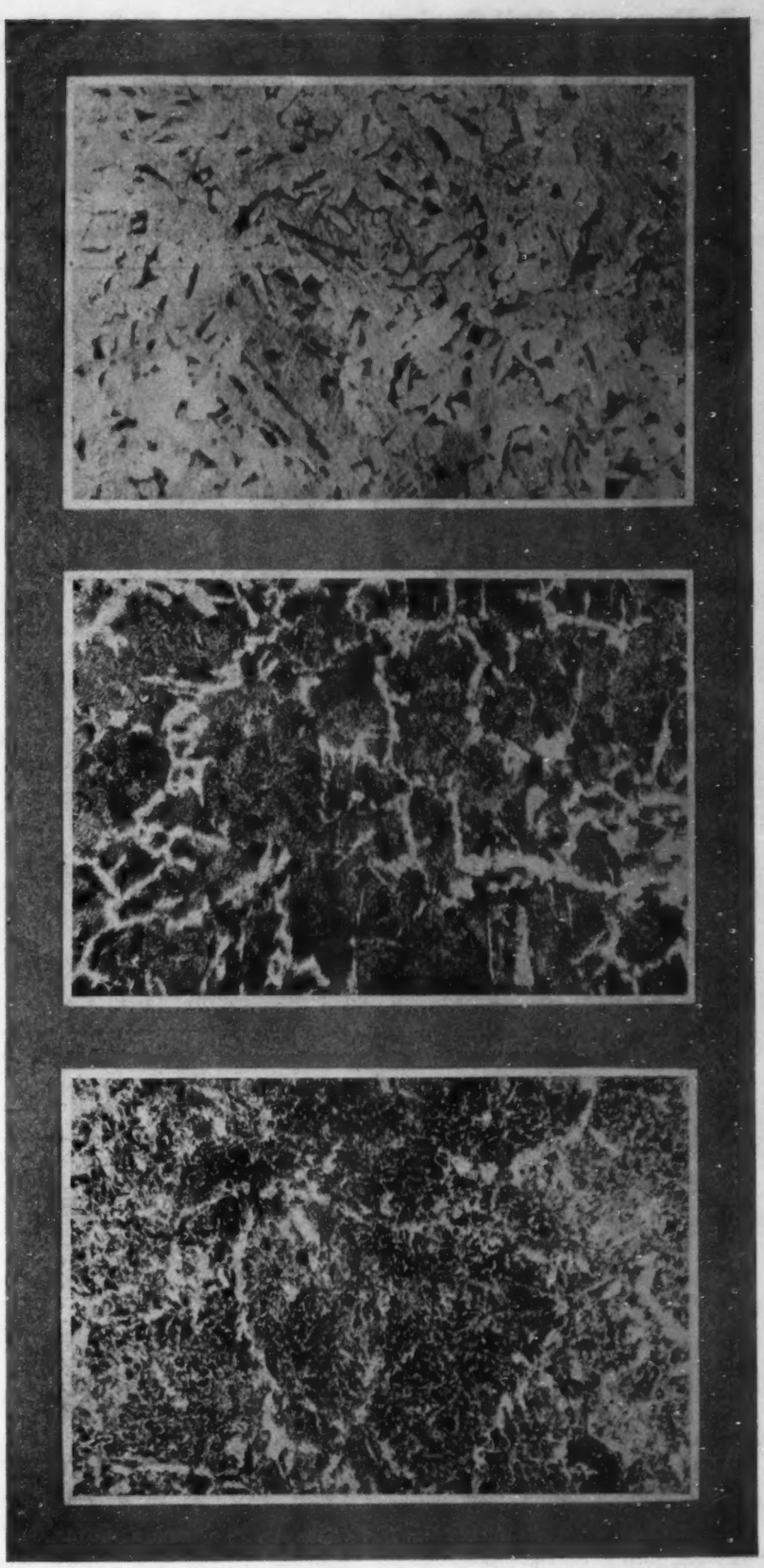


FIG. 6—STRUCTURE OF A FAILED STEEL PIPE WHICH WAS OVERHEATED FOR BENDING

FIG. 7—STRUCTURE OF LOCOMOTIVE AXLE WHICH FAILED DUE TO POOR HEAT TREATMENT

FIG. 8—ANOTHER FAILED LOCOMOTIVE AXLE WHICH WAS ANNEALED AT TOO LOW A TEMPERATURE

## Failures in Coil Spring Manufacture

*By William D. Mainwaring*

In 1904 while the writer was employed as metallurgical engineer of a large spring manufacturer, several springs that had failed in a peculiar manner, were shipped to him for investigation. These springs which represented a considerable quantity and which had all failed in a similar way, had successfully passed the final test, which consisted of being closed up tight about four times in a bulldozer tester; yet upon being taken out and thrown upon the shop floor or struck a sharp blow with a hammer simply fell apart from the force of the blow.

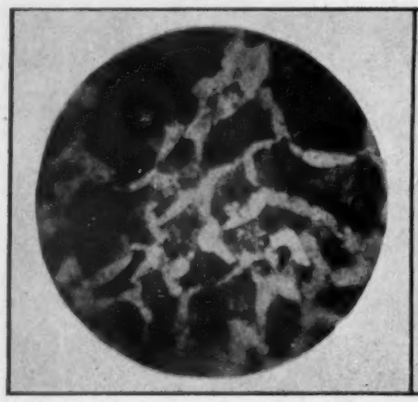


FIG. 1—STRUCTURE OF SHELL OF SPRING-CARBON 1.28 PER CENT

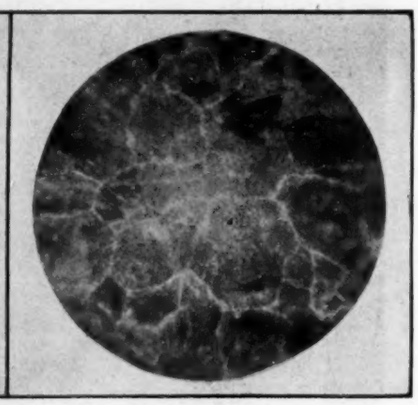


FIG. 2 — STRUCTURE OF CENTER OF SPRING-CARBON 0.64 PER CENT

Upon receipt of the broken springs each piece was examined for physical defects. It was observed, that the bars from which they had been coiled, were composed of two distinct structures, consisting of a core and outside shell. One of the pieces was annealed, analyzed and microscopically examined as shown in Fig. 4.

Upon examination of the accompanying table of analysis and microphotographs, it will be driven home that such a bar of steel, would be subjected to very complicated stresses upon being coiled into a spring. First we have the strains induced by coiling the bar and second those induced by the hardening operation, all waiting to be set free by any means whatsoever. This spring on being tested by being set on end under tester and closed tight would be stressed longitudinally giving each and every part of spring from center to outside, a chance to do its share of the work imposed. If, however, we strike the spring a blow, so as to cause it to vibrate strongly, such stress could not from the nature of the material act in unison. Therefore the spring failed.

The next point to consider is a possible manner for the formation of the two distinct structures shown by the microphotographs. First consider the influence of the mold upon the liquid steel, during casting. When steel is poured from the ladle into the mold, an outside skin is almost instantly formed against the surface of the mold, the thickness of the shell depending upon the temperature and thickness of the walls of the mold. If a heat high in temperature was poured into very cold molds, this skin or shell, would be of abnormal thickness, it would also have a great tendency to segregate badly, thus accounting for the low carbon in the shell. We should also consider the possibility of forming such a shell by oxidizing the carbon contents of the shell during the subsequent reheating operations in the various rolling mills. If steel is heated in an oxidizing atmosphere, it will decarborize, setting free more and more ferrite, until in some cases of abnormally bad practice, an outside shell of ferrite will be formed. But it is inconceivable that such a state of affairs would exist so as to leave an outside shell having the thickness as shown in sketch on the finished bar. A further proof that the shell could not have been formed during the re-heating operations, was the fact that a very thin skin of lower carbon contents existed on the outside of the shell, thus indicating the shell was formed in the steel plant. The remedy is to take more care in casting.

ANALYSIS OF FAILED SPRING.

| Sample No. | Diameter of hole inches. | Analysis. Carbon. | Phos. | Mang. |
|---|---|---|---|---|
| A-1 | 1/4 | 0.64 | 0.027 | 0.41 |
| A-2 | 1/8 | 1.15 | ..... | .... |
| A-3 | 1/4 | 1.24 | ..... | .... |
| A-4 | 3/8 | 1.25 | ..... | .... |
| A-5 | 3/4 | 1.28 | 0.026 | 0.45 |
| B-6 | 1/2 | 1.14 | 0.026 | 0.44 |

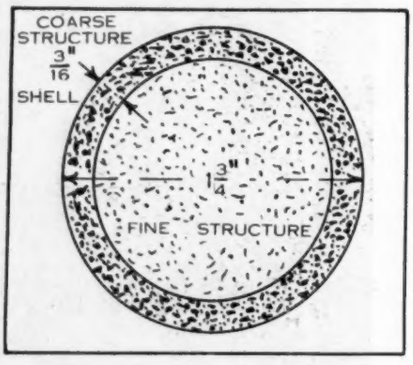



FIG. 3—TYPE OF STRUCTURE SHOWING SHELL

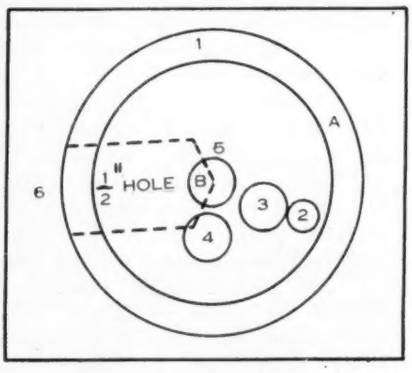



FIG. 4—METHOD OF SAMPLING AND LOCATION OF MICROPHOTOGRAPHS, FIGS. 1 AND 2

## Engineers Meet

The structural section of the Engineers' Society of Western Pennsylvania will hold a meeting Tuesday evening, Nov. 3, in the society rooms, Oliver building, Pittsburgh, at which time a paper entitled "Construction Details of the Lock Gates of the Panama Canal" will be read by R. A. Pendergrass, engineer, McClintic-Marshall Co. The next regular monthly meeting of the society will be held Tuesday, Nov. 17, when A. W. Thompson, general manager, Baltimore & Ohio railroad, will present a paper entitled "The Magnolia Cut-Off of the B. & O. R. R."

As a general thing a tool for turning brass should be tempered harder than for steel. A tool for brass should as a rule have less clearance both top and bottom than one for steel.

"Steel Castings" is the title of a house organ published by the Tropenas Converter Co., New York City, the first issue having appeared under the October date. The leading article by G. Muntz, of this company, is entitled "Tropenas Converters versus Electric Furnaces for the Manufacture of Steel Castings." The purpose of "Steel Castings" is to disseminate information concerning the manufacture of the product from which it derives its name.

## Motor-Driven Rolling Mills

The Standard Machinery Co., Providence, R. I., now is manufacturing the direct motor-driven rolling mills shown in Figs. 1 and 2. Electric controllers on these motors allow continuous operation at any point between half and full speed of the rolls. Motor drive also permits the placing of the rolling mill to secure the most advantageous handling of material, regardless of the location of line shafts.

The large mill shown in Fig. 1 is driven by a 90-horsepower, 850-revolutions-per-minute Westinghouse alternating current motor and is used for the cold rolling of steel. The housing rolls are 11 inches in diameter with a 12-inch face. The intermediate roll is five inches in diameter. The gearing is triple trained.

The small mill shown in Fig. 2 is driven by a 3½-horsepower, 1,150-revolutions-per-minute Westinghouse direct current motor and is used for rolling jewelers' supplies. The hand wheels for setting down the rolls are equipped with micrometer adjustment. The motor is located under the mill, the entire outfit requiring no more space than the rolling mill itself.

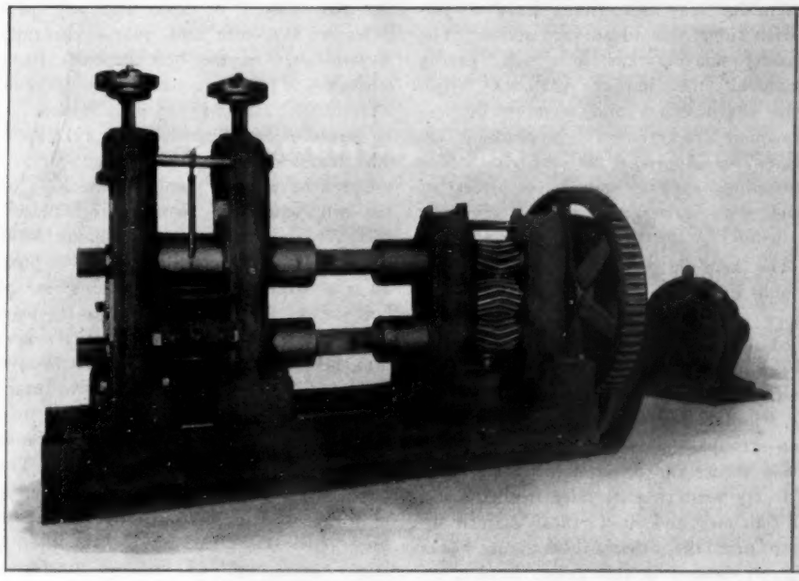


FIG. 1—MOTOR-DRIVEN MILL FOR COLD ROLLING

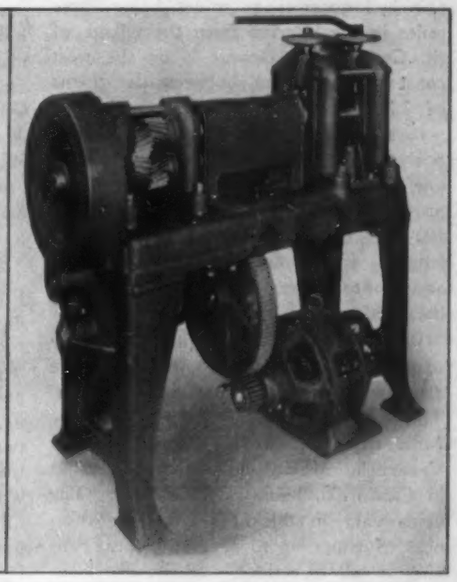


FIG. 2—MILL FOR ROLLING JEWELERS' SUPPLIES

## Cost of Power

An interesting book entitled "The Cost of Power" has been issued by the Fuel Engineering Co., New York. The authors, Gerald B. Gould and Carleton W. Hubbard, state that the book was originally written for private distribution among about 200 manufacturers and contains the results of the co-operative effort of these manufacturers to eliminate guess work methods in the selection and purchase of coke and the development of power. The volume is divided into several parts which deal respectively with the general features of the power problem, qualities of coal and coal testing. A limp leather binding, gilt edges and good press work add to the attractiveness of the book.

## Tire Heater

The Hauck Mfg. Co., Brooklyn, has recently developed an apparatus for heating wagon, truck or locomotive tires, using kerosene fuel. The heater consists of a central cast iron combustion chamber, having eight separate radial outlets leading toward the tire. These outlets are equipped with sleeves which are adjustable to tires of any size from 30 to 80 inches in diameter. At the end of the sleeves is a special iron hood which distributes the heat along the tire and prevents it from escaping. The flame is furnished by a standard Hauck kerosene oil burner connected by 6 feet of hose to a 12-gallon tank made of seamless drawn steel.

## Book Review

*Science and Practice of Management,* by A. Hamilton Church; 535 pages, cloth, published by the Engineering Magazine Co., New York, and furnished by THE IRON TRADE REVIEW for $2.00.

This work is a careful and detailed analysis of organization as applied to manufacturing and an attempt to formulate such fundamental facts and such regulative principles as hereafter may be developed into a true science of management. A series of articles by Mr. Church in the *Engineering Magazine* in the first half of 1913 discussed the application of certain principles and the present volume is an enlargement of the ideas there worked out. The idea has been developed that management is based on the existence of specific organic functions, each devoted to a special purpose.

The author divides all industrial undertakings into two elements, the determinative, which has to do with policy, and the administrative, which takes the determined policy and gives it practical expression. It is with the latter the volume under review has to do, paying especial attention to the functions of manufacturing, exclusive of selling and distribution.

The assumption that various factors are organic in their functions is following an analogy with the organs of the human body, which act independently and yet in co-ordination. Without agreeing or disagreeing with the ideas developed it is not too much to say that the volume is a valuable addition to the literature of management and efficient administration.

The American Society of Mechanical Engineers, New York, has issued the fourth annual edition of its condensed catalog of mechanical equipment. Like the three preceding yearly volumes, this work aims to present in a highly condensed form the principal facts and details concerning the various classes of mechanical equipment, thus serving as a convenient index to a great number of individual catalogs issued by manufacturers. The book is profusely illustrated and contains 307 pages.

# Some Facts Regarding Magnesite

## Data Regarding the Occurrence, Preparation and Uses of Magnesite— Description of the Austrian Deposits

BY L C MORGANROTH

MAGNESITES are of two general classes—massive and crystalline. Massive magnesite is very widely distributed. It is found in Greece, California, Africa, India, Australia, Mexico, South America, and deposits of varying sizes occur in several of the European countries. Those on the Island of Euboea, Greece, are probable the most important deposits of this character of magnesite. They have been worked for a number of years, the principal quarries or mines being three miles in the interior from the village of St. George. St. George is on the west coast of the island, between the towns of Limni and Khalkis. The magnesite occurs in veins or lenses in serpentine. Some of these lenses are very large; one worked several years ago was approximately 50 feet in thickness, 75 to 100 feet high and 300 feet or more in length. The magnesite is pure white and makes a very prominent feature of the landscape.

While massive magnesite is widely scattered over the world, many of the deposits are in veins too thin to work. The usual mode of occurrence is in the form of stock work, the deposits in Venezuela, Mexico, and many of those in California, being of this form. The veins vary in thickness from the thinness of paper up to several inches, running in all directions, occasionally leading to a mass or nucleus of some size. The spaces between the veins are filled with a disintegrated serpentine in the form of sand. Several of the deposits in California would probably be workable, if they were more favorably situated with reference to transportation, but by far the majority of the deposits are too poor to work. At one deposit, worked several years ago, they were handling four tons of refuse to one ton of magnesite.

In the preparation of this magnesite for use the process is practically the same as that which will be described under preparation of the crystalline variety; with the exception that the magnesite is not dead-burned being burned only to what is known as the "caustic" state. In this form it contains two to five per cent $CO_2$. The reason for this is that caustic magnesite is used for a different purpose than the crystalline.

Crystalline magnesite is found practically only in Austria and Hungary. It occurs in dolomite to which it owes its origin. The crystalline variety of magnesite differs markedly from the massive. The massive is a white chalky-colored mineral, but the crystalline is a blue-gray or drab, or rather a mixture of crystals of various shades of grays and drabs. Both the massive and the crystalline magnesite may sometimes have a yellowish tinge, due to surface stains. The massive variety has a rough, earthy fracture; the harder varieties break with sharp edges and a more or less concoidal fracture. The crystalline varieties break more irregularly. The crystalline variety may have pieces of black slate scattered through it giving it a decidedly mottled appearance.

The beds in which the magnesite is found in Austria and Hungary follow more or less a northeast and southwest line that would about cross between the cities of Vienna and Budapest. The valleys of the Danube and its tributaries divide these deposits into two groups. The Austrian group extends across the province of Steiermark, with its western extremity near the city of Salzburg and its farthest eastern deposit near the town of Gloggnitz. The biggest deposit in this group is near the town of Veitsch. The Hungarian deposits have their western extremity near the village of Divin; the eastern extremity is not clearly defined and may extend into Russia. The largest deposits in Hungary are midway between the towns of Jolsva and Nyustya. It is not to be inferred that magnesite is found throughout the entire district between these extremities in either country. The magnesite occurs only in isolated lenses, and while some of these lenses are very large, many are too small to be worked profitably. It is probable that commercially workable deposits in Austria and Hungary do not exceed a dozen in number.

The method of mining and preparing magnesite in Austria and Hungary is practically the same in all plants. Following is a description of the Veitsch operation, as this deposit is the oldest and one of the largest found in Austria-Hungary. The deposit is a huge lens found in an isolated hill surrounded on all sides by barren rocks. It is on the outskirts of the village of Veitsch, which is about 65 miles southwest from Vienna. The entire top of the hill is magnesite. From the top to the base of the magnesite is from 700 to 800 feet, the bottom of the magnesite being about half way down the hill. The quarry is worked in a series of steps or levels.

The material is blasted out of the solid in the ordinary manner of rock quarrying. The magnesite is broken to one-man pieces, or less, and any particles of dolomite and quartz carefully sorted out. In the best deposits there is always a large amount of this gangue. Practically one-half of what appear to be levels of the quarries are spoil banks. The magnesite, loaded on tram cars, is lowered by gravity planes to the base of the hill, where the works are situated. Here it is burned in continuous kilns of the bottle variety. These kilns burn on the average 12 to 15 tons in 24 hours. As a rule, producer gas is used as fuel. Within the last few years several plants have installed kilns of the rotary or cement type to burn the magnesite, powdered coal being used as fuel. The capacity of these rotary kilns is probably 50 to 60 tons in 24 hours. The magnesite can be burned as thoroughly in these kilns as in the bottle kilns, but they have one disadvantage, in that a larger percentage of fines is produced.

The magnesite as burned in the bottle kilns is drawn about every six hours. It is quenched with water and then passes through a crusher, which reduces it to the size of a walnut or less. It is then screened, being separated into three sizes. From the screens it goes to the picking tables, where the underburned pieces of magnesite, together with any dolomite or quartz, which were too small to be removed at the quarries are picked out. The largest sizes of magnesite are again crushed and these smaller pieces are re-picked. The magnesite finally is crushed to the size of corn, again picked over, and then put in sacks holding from 150 to 200 pounds. In this shape it is shipped to the user.

Magnesite in burning loses about half its weight in the passing off of the $CO_2$. No effort is made to save this gas. Within recent years an economy has been effected in the picking or sorting of magnesite by the installation of magnetic separators.

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Portions of a paper read at the Pittsburgh meeting of the American Institute of Mining Engineers.

# How the Plant is Kept Running

## A Discussion of the Repair Facilities Necessary for the Economical Operation of a Modern Steel Plant

BY JOHN HULST

THE steel plant has no parallel both in the continuity of its processes and in the very large units of which it is composed. From the reduction of the ore in the blast furnaces through the processes of steel making and rolling, the one process is closely linked with the next, so that practically it is continuous. The steel plant of today with its blast furnaces, each having a capacity of 500 tons or more, with its steel producing units still increasing in size, and with its rolling mills of very large capacities—and these units all dependent upon one another—presents difficulties seldom encountered elsewhere. The vast amount of capital invested as a total, as well as in each of the large separable units, makes it of prime importance that all operations, from the ore to the finished steel, be interrupted to the least possible extent.

The success of the steel plant of modern design is therefore largely dependent upon the extent to which delays are eliminated, and this constitutes the daily study of the mechanical and electrical superintendents and their forces. Their success in turn is dependent, not only on their keeping in close touch with the condition of all machinery from day to day, knowing when replacements due to wear will have to be made, anticipating even the breaking of a weak part, but also to a large extent on the resources the repair departments have at their disposal.

An intimate association with the different classes of machinery will soon make manifest the more frequent breaking or necessary replacing of one part as against another, and it is from this actual experience that one is enabled to determine the number as well as the kinds of spares it will be necessary to carry.

Steel plant practice in order to meet the extremely hard and continuous service has made use of all resources available; we might mention the adoption of very low working stresses, the more liberal use of steel castings, the use of rolled steel wherever possible for gears, wheels, etc., and the elimination of cast iron except where stability is required or severe strains are absent or where subjected to abnormal heat.

However, wear cannot be avoided and continues until replacement is necessary or breakage occurs, also accidents due to the unexpected, as explosions, cold steel in rolling, etc., and those due to mistakes in judgment, all leave their share of broken parts to be replaced. In addition to these we have the replacements made necessary through constant exposure to excessive heat, such as ingot molds, stools, furnace doors, valves, etc.

The repair facilities, therefore, loom up as the mainstay of continuous operation so necessary for the final success of the plant.

### *The Repair Department*

The preparation of spare or repair parts may be divided into two distinct operations and classes of facilities:

A—The Making of the Rough Materials:
- 1—Iron Foundry,
- 2—Steel Foundry,
- 3—Roll Foundry,
- 4—Brass Foundry, etc.,
- 5—Pattern Shop and Pattern Storage Building.

B—The Finishing of the Rough Materials:
- 1—Machine Shop,
- 2—Electric Repair Shop,
- 3—Forge Shop,
- 4—Pipe Shop,
- 5—Structural or Boiler Shop,
- 6—Roll Shop,
- 7—Locomotive Repair Shop.

### *Making the Rough Materials*

This classification leads us to the consideration of foundries for iron, steel, brass, etc. Other rough materials, such as structural shapes, plates, forge steel, etc., can readily be eliminated from our consideration, as they are products of steel plants and each plant would furnish all of this class of rolled material that comes within its schedule. The question as to what extent these facilities should be included in steel plant equipment is purely an economical one.

We have in mind a moderate size steel plant completely equipped for the successive processes from the ore to the finished billets, tin bars and rails, having a capacity of 90,000 to 100,000 tons of rolled steel per month, which used the following tonnages of repair castings during the year 1913:

| | Tons. | No. of pieces. |
|---|---|---|
| Iron castings | 1,398 | 23,377 |
| Steel castings | 1,058 | 6,937 |
| Rolls—steel | 722 | 206 |
| Rolls—iron | 606 | 216 |
| Brass castings | 18 | 13,400 |
| Babbitt | 64.5 | |

There can be no doubt that a foundry having ample facilities for making the simpler iron castings would be advantageous both from practical and economical standpoints, especially when we have in mind the possible location of the foundry readily accessible to the blast furnaces, using the hot metal direct for all castings such as floor plates, wearing plates, mold stools, etc., in fact, for any castings which do not have to stand severe working strains. This has been demonstrated at some plants by making of all kinds of open sand castings at the end of the furnace cast house, making use of the hot metal direct from the furnaces. Of course, this practice is limited by the small amount of space which is available.

As to the complicated castings, requiring special molding facilities, complicated core work, etc., on account of their infrequent occurrence, there would be a question as to the advisability of making these, and the solution can only be found in local conditions. The answer is dependent upon the number of these castings and their resultant tonnage and the proportion of skilled versus unskilled labor required.

In general, it would not be an economical proposition for a moderate size steel plant to be equipped for taking care of special high-class foundry work, because a single plant would not have sufficient work of this kind to keep their expert men busy and skilled labor would be working on the rough class of work.

### *Steel and Roll Foundries*

The steel foundry and the roll foundry as plant facilities can be fairly questioned as to economy when dependent upon a single plant for their tonnage and also on account of their special requirements both in labor and material. These foundries necessarily

A paper presented at the Birmingham meeting of the American Iron and Steel Institute, Oct. 29, 1914. The author, John Hulst, is chief mechanical engineer, Carnegie Steel Co., Pittsburgh.

carry a considerable overhead expense and a lack of tonnage is fatal to their success.

The steel foundry based on acid or basic open-hearth furnaces requires almost continuous operation in order to keep the furnace repairs within reason. The available tonnage of steel castings based on figures previously given is about 1,058 tons annually, or an average of 3.5 tons per day. This would mean a one-furnace foundry running about one heat per week, a serious condition for open-hearth practice, and one not to be considered except in direct connection with open-hearth steel plants, so that part of the open-hearth product can be readily diverted to the foundry, thereby saving the cost of re-melting and making it possible to obtain the advantages due to continuous operation of open-hearth furnaces. Interrupted open-hearth service is detrimental, either from the alternate cooling and heating up of the furnaces, or the continuous heating required between casts with large idle periods becomes serious from an economical standpoint.

The brass foundry as well as the babbitt pot should be universal plant facilities because of the small amount of space required; the small investment necessary; the large number of brass castings, such as bushings, etc., required and available for the brass foundry and the numerous bearings, slides, boxes, etc., which require babbitting and are available as a source of revenue from the making of babbitt; the fact that these two materials, brass and babbitt, are largely used throughout all machinery to take the brunt of the wear and require frequent replacement, and on account of the rough service, a cheap grade of babbitt can be used successfully on most of the mill machinery.

The pattern shop and pattern storage building have always been classed as an important plant facility in connection with repairs on account of the necessity of patterns, due to the repeated use that can be made of these patterns, owing to the necessity of owning these patterns in order to make their repeated use available, as well as to facilitate procuring competitive prices on the castings. The fact that these patterns are destructible and should not be subjected to excessive handling or exposure to weather requires that they be properly housed.

### *Finishing the Rough Materials*

A modern steel plant should have sufficient shop facilities to take care of all ordinary repairs by working day turn, thus taking advantage of the maximum amount of light possible. This then leaves a margin for exceptional repairs or even considerable work on the finishing of materials for construction purposes by working night turn.

In this way it is possible to get the best results during normal running of the plant, and we can still make use of the facilities to great advantage during construction or reconstruction periods. It is due to this that we find such extreme variations in shop equipments, the poorly equipped plant being forced to run their shops more or less double turn, at a sacrifice of economy and flexibility in capacity.

In general, the shops should be centrally located, easily accessible and should have good roadway and track connections with all parts of the plant. It is also very important that considerable space be allowed for future extension of the shops in order that they may keep up with the growth of the steel plant. For the proper storage of general supplies the shops should have a storeroom for classifying and keeping record of all supplies which, due to their size, would be lost, or, due to their deterioration, would be spoiled if stored in the open. There should also be a general yard for the storage of materials in the rough provided with proper handling facilities. All such facilities tend to make this material more available as well as more easily accounted for, reducing loss or unnecessary duplication.

The most important repair facility for finishing the rough materials is the machine shop, and closely allied with it are the electric repair and forge shops. The electric repair shop has a great deal of its work done in the machine shop and a large proportion of the product of the forge shop has to go to the machine shop for final finishing. The work of these three departments either overlap or one does the preliminary work for the other. It would seem justifiable, therefore, to consider the advantages accruing by concentrating these shops so that ready communication and transfer of materials from one to the other may be had and the duplication of machinery for similar kinds of work may be avoided.

The most important machine shop tool is the lathe, being capable of doing all kinds of work, such as boring, facing, drilling, threading and with special attachments may be called our most universal and adaptable machine. The lathe equipment covers a very large field in repair work, which accounts for the variation in sizes and lengths of bed required. The sizes range from 14 inches to 60 inches, with lengths of bed from 6 feet to 30 feet. The equipment should have ample capacity. For instance, lathe beds should be of sufficient length to prevent the necessity of turning the piece end for end in order to complete the job. The large planer should be provided with a removable housing on one side so that additional flexibility may be had as to the maximum width of piece that can be finished, and at the lowest first cost. Planers should be equipped with side heads in order to eliminate as much resetting as possible. Additional serviceable tools which are gradually becoming standard on account of their adaptability should be provided. The horizontal boring mill capable of milling, slotting, boring, etc., is now recognized as a most useful tool. The turret lathe for the duplication of parts is a very economical tool and flexible as to the kinds of work it can do. The gear cutter or planer, due to the increased use of cut teeth in general mill gearing, is fast becoming a necessity. Machine shop tools in general, such as planers, drill presses, shapers, slotters, bolt cutters, key seaters and grinding machinery have been fairly well standardized and the choice between the different makes is largely a question of design as regards stability, accessibility and simplicity.

The forge shop tools are few, outside of the number of forge fires necessary. Steam hammers ranging from 1,500 pounds to 5,000 pounds weight of forging head are in general use, although the rapid forging press is now receiving considerable attention due to its reputed economy as well as the claimed superiority of its product.

### *The Pipe Shop and Structural or Boiler Shop*

The pipe shop, as well as the structural or boiler shop, should be conveniently located. Floor space for working and storing materials is here a most essential factor. In both cases the total machinery required is small owing to the similarity in the work performed and the fact that the work is limited to a single field. In neither case is the product subjected to wear, breakage, etc., to so great an extent as to the products of the other shops. Both are important plant facilities, however, and the economies resulting from their work, as well as the prevention of shut-downs or delays, well warrant their being equipped with proper facilities and ground space. The machinery required is of standard design. In equipping the boiler shop, stability as well as capacity of the tools should be considered. In gen-

eral, punches should have a capacity up to 1-inch diameter through 1-inch plate, and shears up to 1-inch thickness.

*The Roll Shop*

The roll shop is a very special repair facility devoted to the turning up of new and the redressing of worn rolls. Owing to the number of products from our rolling mills and the necessarily frequent roll changes, due either to wear or to changing over to another product, the number of rolls in stock has become a most important factor, so that this department should be thoroughly equipped not only with the necessary roll lathes, roll and neck grinders, etc., but also with proper handling facilities and roll storage racks in order that all rolls may be readily accessible. Some system of records is also essential to ensure that the proper rolls as well as the stock supply of rolls will be available.

The locomotive repair shop is becoming more and more important. The number of broad and narrow-gage locomotives necessary to take care of the inter-mill and department work, and the frequent inspection of each locomotive as required by law, as well as the necessary repairs demand recognition. While all repair parts can be finished by the different shops, it is desirable to have a separate building for preparing the engine to receive these parts. It is more convenient, when possible, to run the locomotive in as well as out of the repair shop under its own steam. This means a considerable steam and smoke nuisance when blowing down, cleaning fires and starting fires, which would be objectionable unless done in a separate building. Also repair pits are necessary, and the tracks together with the pits make the floor space unavailable for other use.

The Thermit process can be used to quite an extent and to advantage in repair work, especially in repairing broken castings of considerable value which otherwise would have been scrapped. Necks have been built up successfully on broken mill pinions, with an increase in strength over the original casting. Locomotive frames have been welded, building a section at the point of fracture, increasing the strength of the frame. There are many heavy welds which can be made better by the thermit process than in any other way. The equipment required is negligible, but its successful use requires some experience.

Oxy-acetylene, also has proved its usefulness as a repair facility. The apparatus is portable and capable of both cutting and welding, and has been used in welding up seams on blast furnace stoves without removing any of the brickwork and no caulking was afterward necessary. Locomotive frames have been repaired, stay bolts, fire-box and warped sheets can be cut off and cracks in fire-boxes have been welded. It has been used for welding up broken shafting, welding and building up teeth on gear wheels, welding defective pipe, welding up cracks in furnace shells, and stopping up rivet holes. In fact, its use has become very general and has resulted in marked economies in repair costs.

Portable rigs, such as the cylinder boring rig, crank-pin turning devices, drilling outfit, etc., are very successful where it is impracticable to do this work except in place.

*Organization*

The results obtained and the extent to which delays are eliminated again depends upon the initiative of the mechanical and electrical departments. Complete and thorough organization, with each branch knowing what part they will have to play, and with all branches harmoniously shouldering their responsibilities, forms the essential factor which through the use of the repair facilities makes possible the successful operation of a steel plant.

## Cutting Down Expenses

The Whitaker-Glessner Co., Wheeling, W. Va., has announced a reduction of 10 per cent in the pay of all salaried employes. The reduction also affects salaried men connected with the Wheeling Corrugating Co., Wheeling, and the Portsmouth Steel Co., Portsmouth, O., subsidiary interests. While there has been no readjustment of wages to men employed in the several mills, reduced operating schedules are equivalent to a cut in pay. The continued depression in the steel trade, officers state, is responsible for the adoption of a retrenchment policy. The reduction is similar to those recently made by the Pittsburgh Coal Co. and the Westinghouse Machine Co., Pittsburgh.

The Adamson Machine Co., Akron, O., is building an addition to its iron foundry 160 feet long and 80 feet wide. The building is of concrete, steel and brick construction and will be equipped throughout with modern appliances. This addition will increase the length of the foundry to 320 feet and the daily capacity when this extension is made will be 30 tons. The approximate cost of the building will be $25,000.

## Iron, Steel and Coal in Dixie—I

(*Continued from page* 816.)

were enlarged by the acquisition of the large area of brown ore lands previously owned by the Lady Ensley Iron Co., located in the Russellville district, and the three blast furnaces at Sheffield and Florence, to which these brown ores were tributary, the name of the company being then changed to Sloss-Sheffield Steel & Iron Co.

*Development of Foundry Iron*

As a result of these various consolidations, competition for the foundry trade became intensified, and the prevailing low prices and excellent foundry qualities of southern pig iron led to a large development in the south of the cast iron pipe trade. The foundries at Chattanooga, Bridgeport, South Pittsburgh, Anniston and Bessemer were then established, followed in subsequent years by those at Sheffield and North Birmingham. Until this trade became over-built, and riveted steel pipe became an opposing factor where heavy freight rates were involved, it was a profitable industry; the pig iron being the principal factor in the cost of the pipe, and this being sold at extremely low prices, with mere switching rates from the furnaces to the pipe foundries.

In 1888, prior to the establishment of these foundries, the writer analyzed the shipments of the largest producer and found that the product was shipped over 30 different states, and that the entire consumption in the south amounted to only 13½ per cent. The influence of the pipe foundry movement is rendered apparent by a similar abstract made in 1894-5, showing that while the product was then distributed over 39 different states and five foreign countries, the southern consumption had risen to nearly 22 per cent, Alabama alone being advanced from seventh in order to second.

This movement was of supreme importance, for the southern consumption of forge iron had been steadily dying out. The earnest efforts of General Powell and Mr. Schofield at Chattanooga, with Major Peters of Brierfield, had proved in vain. The relentless march of steel was pushing manufactured iron into the background, both as to plates and bars, and wire nails were making inroads upon cut nails. The works at Helena had also fallen by the way, although the Knoxville mill succeeded, and continues to this day.

(*To be continued.*)

# Building on Solid Foundation

## Methods of Extending Foreign Business Discussed by National Machine Tool Builders' Convention—Sympathy for Warring Nations

Foreign trade extension and the methods and problems of its accomplishment, occupied the major portion of the deliberations of the thirteenth annual convention of the National Machine Tool Builders' Association at the Hotel Astor, New York City, Oct. 22 and 23. Consideration of this question now commanding first attention in the commercial life of the United States, in the case of machine tool builders, however, was not so much along the line of primary or pioneering effort as toward the development of a trade already well established since this industry now has brought its foreign business to large proportions. It was stated that machine tool builders of the United States have been exporting about 35 per cent of their output. The discussions and thought of the New York convention, accordingly, were given to the safeguarding and enlargement of the trade already commanded as well as to the broadening of merchandizing effect into new fields. Preparations are being made to circulate the literature of the association, in various languages among foreign buyers and to send an experienced representative to Central and South American countries to report upon the opportunities there presented. Approval was given in the resolutions to the campaign of the railroads for increased revenue through higher freight and passenger tariffs; to the plans that have been launched for the betterment of banking and transportation facilities to South America; and an expression of sympathy for all European nations at war with the hope that the good offices of the United States finally may be employed to establish peace, was adopted. The convention was a large one, about 125 manufacturers being in attendance.

### Freight Rates

"During the summer, one of our western members called our attention to the fact that efforts were being made on the part of the railroad people to reclassify the freight ratings on some of the products of members of our association, and the question was asked whether we had busied ourselves regarding such a matter," said President W. A. Viall, of the Brown & Sharpe Mfg. Co., Providence, R. I., in his annual address at the opening session. "This has not been done by us in the past and it seems fitting that it should be one of the activities of our association gathered together as we are for business purposes and it certainly cannot be violating any laws of the land if we act in unison on such a vital question as railway tariff. As an association, it is fair to be presumed that we are in accord with helping the railroads in getting a fair return on their investment and would not stand in the way of any legitimate requirements for a proper compensation for services rendered, but if the railroads undertake to differentiate unjustly against certain classes of an industry, it would seem as though it would be incumbent upon us to discuss such a matter as an association.

**Officers 1914-1915**

**President: W. A. Viall, Brown & Sharpe Mfg. Co., Providence, R.I.**

**First Vice President: J. B. Doan, American Tool Works Co., Cincinnati.**

**Second Vice President: D. M. Wright, Henry & Wright Mfg. Co., Hartford, Conn.**

**Treasurer: A. E. Newton, Reed-Prentice Co., Worcester, Mass.**

**Secretary: Charles L. Taylor, The Taylor & Fenn Co., Hartford, Conn.**

**General Manager: Charles E. Hildreth, Witcomb-Blaisdell Machine Tool Co., Worcester, Mass.**

"Many of us were disappointed as much as our railway friends were, at the, to say the least, conservative report rendered by the Interstate Commerce Commission, as to railway rates. We were undoubtedly justified in believing that assistance of this character that could be rendered to the railroads, would reflect upon our own industry. Many of the lines recently have put into effect a schedule calling for some increase in passenger rates, and this has brought forth many protests. It would seem as though it were highly unjust for us to desire the successful running of railroads and yet to take umbrage when the rates really increase either on the freight or passenger traffic. From the above, you will note your president feels that the members of our association best can serve the interests of the railway business by fairly considering various propositions put forth and endeavoring to act upon them in a spirit of justice to the railroads and to ourselves. Looking forward to the future, it does not seem possible, with the large crops we are rejoicing in this year, with the great resources at our command, with peace in our borders, that we shall not see business established upon a firm foundation. Apparently, there are no great industries coming into view that help us to feel that we shall have the boom days of the past, but most of us would be very glad to have a business that would have an even, steady-pulling tone to it and it is this kind of business we have every reason to look forward to and to expect. We have had such abnormally good times in the past decade that we fail to appreciate a condition that may be normal and feel that it is subnormal which in fact has been the condition of late.

"Let us not exploit the sufferings of our European friends, but let us assume the responsibilities that the crisis has brought upon us with a spirit free of hysterics but determined to bring order out of existing chaos."

Routine convention matters, officers and committee reports, occupied the Thursday morning session. C. Wood Walter, of the Cincinnati Milling Machine Co., Cincinnati, chairman of the legislative committee, explained some of the provisions of the Clayton anti-trust bill. S. H. Bullard, of the Bullard Machine Tool Co., Bridgeport, Conn., chairman of the catalog committee, rendered a report of progress. The association proposes to issue a catalog of the products of its members, which will be printed in several languages and will be liberally distributed in foreign countries. An address on "The Establishment of American Banking Facilities in South America" was given by H. R. Eldridge, vice president of the National City Bank of New York City, who explained the plans of his bank for establishing branches in leading South American business centers. In reply to questions from members, Mr. Eldridge gave in detail how his bank proposed to handle the credit arrangements of sales by American exporters to these countries.

"If you are entirely satisfied with the responsibility of the party to whom you are shipping," said Mr. Eldridge, "you will be willing to sell

him on ordinary terms of a draft payable in 60 or 90 days upon the firm itself. In that case, of course, you are not interested, providing you can get a market for that bill; but if you want to sell to some house that you are not very well acquainted with, be it in South America or in Europe, what you are going to require of that man is a reimbursement. He must go to some bank and arrange for that credit, and you in turn must accept the bank that he arranges with, providing the bank is satisfactory to you. But even in an instance like that, you still as the maker of the draft remain the sponsor of the credit, you are responsible for your faith in that purchaser, and that is the custom the world over.

### The Credit Problem

"But of course the liability that you are assuming is very remote. That is the very reason that a prime bank's bill commands such a fine discount over a bill on a firm in England or Germany. No matter how well that firm stands, the bank's credit is regarded as better, and given firms are credited according to the risk involved. That is exactly the arrangement that you have got to make in all your transactions in South America or in any other foreign country, and that is the reason that there has been so much stress laid upon the subject of domestic acceptances, because our country is so vast that the business of this country could not be handled except upon some basis that permits you to sell to a house in Washington that you never heard of by drawing a bill against a bank there, if the bank will furnish the credit. That is the way that has to be done. Now there are undoubtedly houses in Buenos Aires, San Paulo or Rio de Janeiro on which the National City Bank of New York will be perfectly willing to purchase bills, but where you are not satisfied with the credit, certainly you folks have only one thing to do. If they want your goods, let them pay for them, or arrange down there through their own bank. They can, if need be, make a deposit there and cable to you that such an arrangement has been made. There is no difference in methods of doing business with houses in South America in that respect and elsewhere, except that there is a certain amount of inconvenience in getting the necessary information on which to base your credits. We are endeavoring to get our credit files up, as we want to know something about the character of the bills that we have to buy. We are perfectly willing to purchase bills on the more responsible houses in South America as well as on the more responsible banks.

Thursday afternoon E. H. Fish, of Worcester, presented a paper on "Reform in Drawings", illustrating it with blackboard sketches, and Magnus W. Alexander, of the General Electric Co., Lynn, Mass., spoke on "The Waste in the Hiring and Discharging of Men". Mr. Alexander cited astonishing statistics gathered by him first hand from various manufacturing plants, showing the large number of different men that had been hired in the course of a year, to bring about a certain net increase in the total number of employes. He showed a similar, if not worse, condition than this country, in Germany and England, where also he had pursued his research. Mr. Alexander thought the methods of hiring men now generally followed were so wasteful that if manufacturers would give this matter close thought and attention, they would eliminate a large loss in money and efficiency.

Friday morning was given over to meetings of the various machine committees. In the afternoon, at the closing sessions, James Logan, of the United States Envelope Co., of Worcester, Mass., presented a very comprehensive paper on "A Closer Commercial Relation with Latin-America", in which he told of his observations of the political, commercial and geographical conditions in these various countries gained from a recent tour taken as a member of the Boston Chamber of Commerce.

### Favors Railroad Rate Increase

In the resolutions adopted the association advocated that the plea of the railroads pending before the Interstate Commerce Commission be granted for both an increase in freight rates and in the cost of mileage books. "The resolution is adopted with the distinct understanding," the resolution reads, "that the members of this association are shippers of freight, and purchasers of mileage books, but believe that a fair income is necessary for the proper maintenance and repairs of railroads; for their proper extension and for the general prosperity of the whole country." A resolution was adopted expressing sympathy for all the nations at war, regret for the causes bringing on the war and the desire for an early ending of the conflict.

Commendation was given to the action of the National City Bank of New York City in establishing banks in leading cities of South America and of the American Express Co. and of other transportation corporations in this country in their efforts to establish transportation facilities for American merchants and manufacturers in these markets.

A meeting separate from that of

## War Orders Interest Builders

*Placing of large war orders for American machine tools, recently, for shipment to European countries ran strongly in the undercurrent of conversation among the builders in attendance at the annual convention. The lathe makers by far have taken the cream of this business, since the preponderance of the orders given has been in this line. The comfortable sentiments toward business conditions of this class of manufacturers, with a fat order book in view, accordingly, was sharply contrasted with those of their less fortunate co-builders who have been depending mainly for trade upon a sluggish domestic market. Manufacturers of automatic machines, grinders, chucks and certain other tools, however, also have felt the direct or indirect betterment from this influx of buying by such countries as Russia, France, England and Italy, principally. Some of the business placed is for delivery as far as one year ahead. The present demand has given many manufacturers a chance to clean up stocks of machines long carried, which had been regarded almost as dead capital. One New England maker of lathes and automatic machines has moved some stock which had been on hand for five years and has been practically cleaned out of anything that resembles a workable machine. While a number of the builders in the lines affected now are enjoying very satisfactory plant operations, the unusual and probably temporary character of the demand places them in a state of much uncertainty as to what policies to pursue for extension of output which appears to be justified for the volume of business entered.*

the manufacturers was held by the machinery branch of the National Supply and Machinery Dealers' Association at the Hotel Astor, on Thursday. O. H. Meckel, of the Baird Machinery Co., Pittsburgh, vice president in charge of the section, presided. Thomas A. Fernley, secretary and treasurer, in his annual report, gave attention to legislation recently enacted, affecting the business of machine tool dealers. He referred especially to the clause in the Clayton anti-trust bill regarding exclusive selling arrangements. The upsetting of manufacture by foreign builders by the present war, he reported, had nullified the importance of the tariff question for the dealers at this time.

Secretary Fernley reported that the uniform proposal blank continues to be employed by the members of the association in connection with quotations to their customers and has been helpful in minimizing most of the abuses which existed previous to the adoption of this form by builders and the dealers.

Attorney Felix H. Levy, of New York City, addressed the dealers on Thursday and explained various sections of the Clayton anti-trust bill in connection with the business of the members of the association.

# Progress of the South

## Will be Disclosed to Members of the American Iron and Steel Institute at Birmingham Meeting

Many of the leading iron and steel manufacturers of the country are included in the list of nearly 300 members of the American Iron and Steel Institute who will attend the sessions to be held in Birmingham, Thursday, Friday and Saturday of this week. Many of the northern members traveled to Birmingham on special trains. The New York delegation left that city Tuesday afternoon and were joined at Philadelphia by the party from that district. A special train started from Cleveland at 11 a. m., Wednesday, and picked up members of the Institute from Springfield, Cincinnati and other cities. Among the companies represented on this train were: M. A. Hanna & Co., Pickands, Mather & Co., Corrigan, McKinney & Co., the Upson Nut Co., the Cleveland-Cliffs Iron Co., all of Cleveland; the Carnegie Steel Co., Youngstown and Cleveland offices; the Republic Iron & Steel Co., the Youngstown Sheet & Tube Co., the Brier Hill Steel Co., the William Tod Co., all of Youngstown; the Morgan Engineering Co., Alliance; the Deforest Sheet & Tin Plate Co., Niles, O.

The program of the afternoon session on Thursday is devoted to topics connected with the wonderful progress made by the south in iron and steel manufacture. On Friday, a trip will be made to iron and steel plants in the Birmingham district. At noon, a luncheon will be served at Bay View with the Tennessee Coal, Iron & Railroad Co. as host. The Tutwiler hotel will be the headquarters of the meeting and the annual banquet, Thursday evening, will be held in the ball room, presided over by Judge E. H. Gary, president of the institute. There will be numerous impromptu speeches. Friday night a banquet will be tendered Judge Gary by the Newspaper Club.

An official program of the formal sessions showing the subjects to be discussed is as follows:

**THURSDAY, OCT. 29.**

**Forenoon Session, 10 A. M.**

Address by the president, Elbert H. Gary.

"The Use of Steam Turbines for Various Purposes," Frank G. Cutler, chief, bureau of steam engineering, Tennessee Coal, Iron & Railroad Co., Birmingham.

Discussion, Leif Lee and Karl Nibecker, engineers, Youngstown Sheet & Tube Co., Youngstown, O.

Discussion, Alexander L. Hoerr, steam and hydraulic engineer, National Tube Co., McKeesport.

"The Repair Department of a Modern Steel Plant," John Hulst, chief mechanical engineer, Carnegie Steel Co., Pittsburgh.

Discussion, Bertram D. Quarrie, general superintendent, Newburgh Works of American Steel & Wire Co., Cleveland, O.

Discussion, Howard L. Bodwell, assistant district manager, American Sheet & Tin Plate Co., Vandergrift, Pa.

"The Use of Titaniferous Ores in the Blast Furnace," F. E. Bachman, blast furnace manager, MacIntyre Iron Co., Port Henry, N. Y.

Discussion, Arthur H. Lee, superintendent, blast furnaces, Lackawanna Steel Co., Buffalo.

Discussion, Richard H. Lee, superintendent, Lebanon furnaces, Pennsylvania Steel Co., Lebanon, Pa.

A buffet lunch will be served at the close of this session.

**Afternoon Session, 2:00 P. M.**

"The History of the Iron and Steel Industry in the South," James Bowron, president, Gulf States Steel Co., Birmingham.

Discussion, Hiram S. Chamberlain, president, Roane Iron Co., Chattanooga.

"The Modern Development of the Iron and Steel Industry in the South," Thomas K. Glenn, president, Atlanta Steel Co., Atlanta.

Discussion, George W. Connors, president, Connors-Weyman Steel Co., Birmingham.

Discussion, M. P. Gentry Hillman, Carpenter & Hillman, Birmingham.

"Southern Foundry Pig Iron," James W. McQueen, vice president, Sloss-Sheffield Steel & Iron Co., Birmingham.

Discussion, L. R. Lemoine, president, United States Cast Iron Pipe & Foundry Co., Burlington, N. J.

Discussion, Paschal Shook, president, Birmingham chamber of commerce, Birmingham.

## Declares Strike Ended

Denver, Oct. 26.—Prominent coal operators in this state now declare that the great strike in the coal mining regions is over and they gave statistics in support of their assertion. They say that they do not care to carry on negotiations which will lead to any treaty with the United Mine Workers or to any agreement with them, either direct or indirect. A representative of the mining interest makes the following statement:

"The United Mine Workers do not represent our present employes, who are very vigorously protesting against the introduction into any of our communities of any of these trouble makers. The strike is over. The returns on the September output, which were just completed on Saturday, show that the Colorado coal mines' output for September, 1914, is 748,455 tons and that 10,504 men were employed. This is in contrast with the output for September, 1913, which was 754,873 tons, in getting out which 13,274 men were employed. The strike occurred on Sept. 23, 1913. In other words, we are within 6,000 tons of our normal production, and apparently we are making a greater average production with our 10,504 non-union employes than we did a year ago with 13,274 men, of whom 95 per cent (according to the claims of the union) were union men. Of course that is not an absolutely scientific comparison by reason of the fact that in many of the mines there was very little production from Sept. 23, 1913, to the end of that month. However, the total production for 1913 up to and including September, was 7,518,584 tons. At the present rate of increase, it shows that our 1914 production is not going to be very far behind 1913, and certainly enough to supply the demand, which is going to be less than that of 1913. And so I say these figures indicate that the strike is over. This entirely refutes the statement of the strikers in their bulletin No. 7 that we are 'employing men at this additional cost who can only produce half as much coal as a union man'."

The New York office of the Davies & Thomas Foundry Co., Catasauqua, Pa., now located at 30 Church street, New York City, will be discontinued on Nov. 1, because of the poor conditions of business.

# Mine Labor Problem in Michigan

**Progressive Policies of Mining Companies Supplemented by Results of Copper Strike Has Brought About an Apparently Satisfactory Solution**

IN THE iron and copper mining districts of northern Michigan, the disquieting effect of the European war, coupled with the general slackening of business in the country at large during the past year, has led operators to believe that there will be no recurrence for a number of years of the labor unrest, which resulted in the disastrous copper strike. Aside from these contributory factors, however, mining operators in both the iron and copper districts, months ago noted a disposition on the part of their employes to repudiate the various labor agitators who had stirred up the disturbance culminating in the big copper strike.

### *Workmen Contented*

This contentment among the workmen is only natural. Wages have been maintained by both the iron and copper mining companies at a high standard. The very effective steps previously taken to improve working conditions, safeguard the employes from accidents and better the home surroundings of the miner have been continued to a point that surprises one visiting these districts for the first time.

A number of companies have stirred up active competition by offering prizes for miners making the best showing in the gardens which the companies allow them to work for their own use. The men are permitted to plant whatever vegetables they care to and in monetary saving to the men amounts to many thousands of dollars a year.

The schools throughout the mining districts are models. An imposing two-story brick school building, generally located on the crest of a hill, usually is erected before any residences are built on a new town site.

The reason for this is twofold. The mining companies pay heavy taxes and, as a consequence, the counties are better able to support an excellent school system. In addition, the sight of a substantial brick building in a location which a few months before had been a forest, tends to make the miners more secure in their knowledge that the mine will be operated for a number of years. As a result the miners take a greater interest in their own residences, cultivate gardens and become better citizens and more stable and useful workmen for the mining companies.

With these facts in mind, the success of the agitators sent by the Western Federation of labor into the copper districts is surprising. When the copper companies refused to concede the federation's demands, this organization threw its full official and financial strength into the fight. It had been driven out of the Cobalt district of Canada, and the federation leaders realized that success in the copper strike was necessary to the life of the organization and incidentally to keeping these leaders in office.

The copper companies won the strike and at this time there is no indication around Calumet, Hancock and Houghton that only a few months before a bitter labor war had been raging. The spirit among the miners is excellent, the arguments advanced by agitators have been clearly disproved and the foreign miners are realizing that the mining companies not only are treating them fairly, but have done much more for them than a union would have secured.

### *After the Copper Strike*

The cut in wages made by the copper mining companies and necessitated by the European war, has been taken cheerfully by the copper miners, who are only too pleased to secure employment at all. Nearly 60 per cent of the Michigan copper production was exported and the war consequently has cut the companies' sales in just that proportion. Despite this, a number of the companies continue to operate at 50 to 75 per cent of capacity. The Calumet & Hecla Co., the largest producer in the district, is running at 75 per cent and expects to be able to continue at this rate for another year. Its wage reduction of 10 per cent merely offsets a corresponding increase made a year ago. This wage reduction was made first among the officials and clerks in the Boston headquarters of the company.

During the copper strike many of the Finnish miners developed leanings toward Socialism that has been met promptly by the leaders among their own countrymen. An organization called the Anti-Socialist Society was organized near the conclusion of the strike and now includes the greater number of the former strikers.

The Western Federation has sent agitators into the iron mining districts, but their efforts have met with little success. A victory in the copper country inevitably would have resulted in an attempt to unionize the iron mines and no doubt would have provoked a struggle between the operators and the federation. Defeat in the copper strike was a death blow to the federation. The influence of its leaders among the miners of Michigan has been destroyed. The union has no strength among the iron miners. There is a general feeling among the operators that no labor disturbances will arise until a new generation of miners is being employed.

The trouble at Butte, Mont., is a clear indication of the approaching collapse of the Western Federation, according to Michigan mine operators. The Butte field had been tied hand and foot by the federation for a number of years. Miners could not be hired or discharged without the approval of the union delegates.

A fixed scale of wages precluded any possibility of developing the initiative of the higher class of miners. As an example, a former Michigan mine operator tells of visiting a mine machine shop at Butte and talking to an expert machinist and his boy helper. This boy had served his apprenticeship, but in his own words knew little of the machinists trade. The boy was making $4.50 a day, the same as the expert machinist who had been schooled in his trade for 25 years.

The Butte miners, disgusted with the heavy tax laid on them by the federation leaders in carrying on the Michigan copper strike, refused to continue this tribute, drove the union leaders out of town and have organized a local union of their own.

The Western Federation of Miners thus has been driven out of the Cobalt, Calumet, Butte and Bingham fields and there is left only a remnant of the once powerful organization.

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The Joliet Rolling Mill Co., Joliet, Ill., has reduced its capital stock from $250,000 to $2,500. This is done because the property of the company has been taken over by Frederick Cowin & Co., Inc., Chicago, and the Joliet corporation is dissolved. The mill is engaged in rolling bar iron and was acquired by the Cowin company about a year ago.

# Business News from the Capital

## Decision in the Railroad Freight Rate Case Expected at an Early Date—Arguments to be Heard This Week

Washington, Oct. 27.—Decision in the reopened 5 per cent advance rate case, the hearing on which came to a close last Friday, is expected to be rendered by the Interstate Commerce Commission soon, perhaps before the holidays. Arguments will be made on Thursday and Friday of this week.

Testimony for the railroads was completed with the evidence of President Samuel Rea of the Pennsylvania. His summary of the situation was brief and remarkably concise, and considered by many to have given strong support to the plea for further increases in rate. The only evidence submitted on behalf of the shippers was that of Attorney Clifford Thorne, who appeared as the representative of several shipping interests and 12 middle west state railroad commissions. Other shippers' attorneys felt so confident of their case that they considered it unnecessary to put in evidence. They will base their contentions on those incorporated at the original hearing and on the broad principle that nothing has developed since the July decision, other than the war, to change the situation. In regard to the depression suffered by the railroads as the result of the war, it will be maintained that the shippers have suffered similarly, and that the solution of the problem is for the railroads themselves to work out other than by an increase in freight rates. It would, in their opinion, be a shifting of the burden of the railroads upon the shippers to increase rates when nothing has been shown to prove that the shippers are in any way responsible for the situation.

President Rea, in reply to a question by Attorney Frank Lyon, appearing for the Pittsburgh Coal Co., said he saw no way in which the railroads could raise the required revenue unless an advance on low grade commodities, such as coal, coke, ore, limestone and cement, were granted. For the Pennsylvania lines east, Mr. Rea said, these commodities net 49 per cent of the freight revenue, and 44 per cent for the Pennsylvania lines west.

Complete figures covering the financial results of the railroads for the fiscal year 1914, statements of operation covering the months of July and August, just past, and the European war, Mr. Rea declared, showed a condition which constituted a sufficient reason for the commission to grant what the railroads ask.

"Had the railroads before the war been in a sound healthy condition," said Mr. Rea, "it might have been claimed that in so far as their volume of business was temporarily affected thereby, that burden was one which the railroads should have assumed, just as they had previously borne the fluctuations that had occurred from time to time in their business resulting from industrial and commercial vicissitudes."

Mr. Rea declared that he felt the existence of a crisis in the affairs of the railroads can no longer be questioned. Having earned a return of only 3.99 per cent in 1914 on the property investment, with operating revenue diminishing, improvement work suspended, forces largely reduced, passenger and freight service curtailed, maintenance deferred, the witness said this is a time for very definite and certain relief.

### Criticises Railroads

Mr. Thorne's attitude toward the railroad was somewhat bitter. He admitted that today, for the first time, the railroads have some foundation for the claim that they face a crisis.

"But this emergency upon which the carriers are relying today affects practically all of us in the same maner," he said. It was added that the railroads are asking for a sort of war tax and requesting the government to lift the burden off a part of the community and shift it onto the shoulders of others. It was declared that the carriers are proposing a 5 per cent advance in the freight rates, not only in Official Classification territory, but in the through rates between all points in this Eastern territory, "and those states west of the Mississippi river, which I represent."

Further in his testimony, Mr. Thorne said:

"Freight rates are not the cause of the present trouble. The railroads have 'advanced freight rates' on the brain. Whatever ails them, financial difficulties, overcapitalization, general depression in business, oversupply of gold, whatever the cause, they have just one remedy—advanced freight rates a sort of cure-all or panacea."

The present emergency, said Mr. Thorne, can be met in either one or two ways—by the use of accumulated surplus, or by a slight reduction on dividend rates.

## "Mere Dreamer"

Washington, Oct. 27.—The Supreme Court of the United States last week declined to grant the request of attorneys for a review of the conviction of Emmanuel C. Drew, sentenced to five years in the penitentiary for his dream of reviving the "proposed" magic city of Fort Payne, Ala. Drew was indicted for using the mails to circulate false statements regarding his company's attempt to buy the abandoned works of the Fort Payne Coal & Iron Co., which spent several millions in building a hotel, bank, office building and railroad in the Alabama countryside reported to be rich with coal and iron ore.

In asking for a review of his case, Drew's attorneys said that a man should not be punished for having big ideas or undertaking big things, because being a mere dreamer was not being a criminal.

## Can Go Ahead Now

Washington, Oct. 27.—Five Boston companies submitted bids, opened at the Navy Department last Saturday, for the construction of shipbuilding ways and appurtenances at the navy yard in that city, the George T. Rendle Co. being the lowest bidder at $55,666. There were 28 items in the specifications, all but the first being modifications. On these shipbuilding ways will be built a supply ship authorized for the navy more than a year ago.

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## Cambria Earnings Lowest in History

The Cambria Steel Co., Philadelphia, declared the regular quarterly dividend of 1¼ per cent, but made it payable in scrip, redeemable in cash in two years and bearing interest at the rate of 5 per cent. A statement addressed to stockholders informed them that earnings for the eight months ending Sept. 30 were the smallest in the history of the company, netting about 4 per cent of the capitalization of $45,000,000.

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The Youngstown Sheet & Tube Co., Youngstown, has distributed $200,000 to employes under a profit sharing arrangement. The payment represents three per cent of the pay roll for the past year.

# One Week of War, Said Farrell

### Aroused America to Importance of Foreign Trade More Than Had Been Done by Years of Discussion—Meeting of Export Association

Two hundred manufacturers and exporters attended the annual meeting of the American Manufacturers' Export Association at the Hotel Biltmore, New York City, Thursday, Oct. 22. Export trade in its various phases, received attention in the papers and addresses presented by men of authority in the respective subjects. The convention concluded with a banquet in the evening at which Alba B. Johnson, president of the Baldwin Locomotive Works, presided. One of the principal addresses of the evening was made by President James A. Farrell of the United States Steel Corporation, who stated that "one week of European war did more to convince the American public that foreign trade is necessary to our domestic prosperity than 10 years of academic discussion."

Alba B. Johnson, president of the Baldwin Locomotive Works and newly elected president of the association, presided at the dinner. Others who spoke were Edward Ewing Pratt, newly appointed chief of foreign and domestic commerce, who discussed the foreign trade situation; Geo. H. Richards, manager of the foreign trade department of the Remington Typewriter Co., on "The Personal Factor in Foreign Sales"; Dr. Jeremiah W. Jenks, of Columbia University; Vice President Herbert R. Eldridge, vice president of the National City Bank of New York, and others. At the opening session in the morning, Wm. Harris Douglass, of Arkell & Douglass, defended American exporters against the many criticisms of their lack of efficiency, especialy since the war. "We have heard more rot about South American trade from every conceivable source in the last 60 days than 50 years of trading can hope to overcome," said Mr. Douglass. "The truth about South America is that she is now bankrupt. It is only 15 years ago that our first steamer went to South America. What are our transportation facilities today and what has the government done to foster those facilities? Not one passenger boat, but miserable tramp steamers with which to carry our goods, to those lands to the south of us. I don't see any prospect of changing that condition. England, on the other hand, has long years ago established freight and passenger lines to every colony she possessed. Let us put the blame where it rests—on the United States government. That is why we, in 15 years, have won only 15 per cent of the world's commerce and under those conditions, I say, we showed great ability, energy and ambition in accomplishing what we have accomplished."

The following resolution favoring the upbuilding of American merchant marine, was adopted:

"Resolved, That the present situation affords us an impressive example of the vital necessity of an American merchant marine, and we indicate our friendly position toward existing lines and toward wisely considered measures by private enterprise looking to the establishment of further lines flying the American flag."

The following officers and directors of the association were elected: President, Alba B. Johnson, president of the Baldwin Locomotive Works; first vice president, Chas. A. Schieren Jr., president of the Chas. A. Schieren Co.; second vice president, A. N. Hargrove, manager of the foreign department of Brill & Co., Philadelphia; third vice president, W. F. Adams of Clarence Whitman & Co.; treasurer, E. H. Hoxley, of the United States Rubber Co., and Edward V. Douglass, secretary, was reappointed.

The directors elected were James A. Farrell, president of the United States Steel Corporation; W. E. Leigh, Western Electric Co.; W. S. Gavan, Dupont Powder Co.; M. A. Dudin, General Electric Co. and W. N. Dickinson, General Elevator Co.

## Exporting Heavy Trucks

Detroit, Mich., Oct. 27.—A number of Detroit motor car manufacturers, such as the Packard which turns out a heavy truck, are running heavy on orders from England and France. It is believed this business will continue strong until the end of the present hostilities in Europe as the war departments of the allies have placed heavy demands upon the manufacturers.

Business in general in the automobile circles is rather uncertain, along with general lines. Motor car plants have been curtailing their output, eliminating all help that was not absolutely needed and it is not believed that there will be any improvement in conditions before next spring—if then.

The Ford company has been turning away hundreds of men each morning, refusing to take on more laborers, and even reducing its own force. The new Dodge plant will, of course, take care of considerable surplus labor and this factory will be put in operation in a few weeks. The concern has already started engaging its force and when running full time, will probably employ in the neighborhood of 10,000 men.

## Exporting Brewery Machinery

Four car loads of brewery machinery manufactured by the Otto Eick Machinery Co., St. Louis, is en route across the United States via the Wabash, the Orient and the Southern Pacific Railroads, to the Carlton and United Breweries in Melbourne, Australia.

The shipment consists of one bottle cleaning unit, a combination soaker and washer, one vertical pasteurizer, and one automatic bottle self-feed. The Eick company recently made another large shipment of machinery to an Australian customer.

## Conditions Are Improving

Chicago, Oct. 27.—An official of the International Harvester Co. conversant with that Corporation's foreign business states that business with other countries has improved recently as readjustment to new conditions has taken place. Collections in Russia have been resumed after an interruption at the beginning of the war. Harvester plants in that country are operating about 50 per cent. One plant of this concern is located at Lille, France, in the center of the war area. No reports of damage to the plant have been received.

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## Use of Refractories

The Stowe-Fuller Co., Cleveland, has issued a new catalog containing a large amount of information relating to the use of fire brick and other refractory materials. The book is elaborately illustrated and will be found valuable by any one connected with plants using the materials described. There is, for example, an unusually interesting chapter on Seger cones, which are little pyramidal-shaped masses of mineral which softens and deforms when subjected to the action of sufficient heat. These cones are made extensively in Germany, and by Prof. Edward Orton Jr. in this country.

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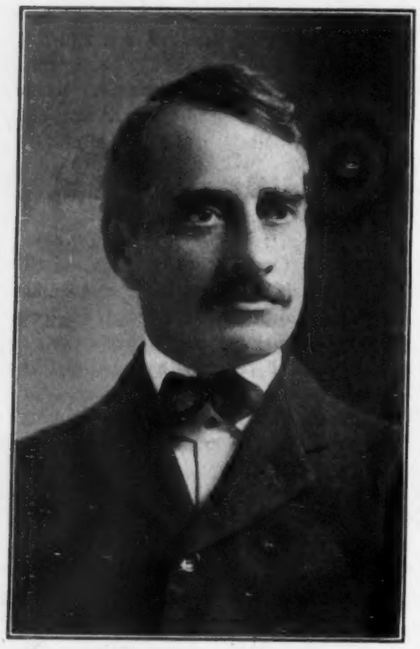
The Carnegie Steel Co., Pittsburgh, has closed negotiations for a large multiple punch for installation in the Homestead Works.

## Arguments in Dissolution Suit

(*Continued from page* 803.)

the steel industry, which have a bearing on the suit, and as such constitutes far more reliable evidence than that submitted from recollection many years after the events. This explanation of the government's brief, it is believed, undoubtedly will have considerable weight with the court.

A spectacular effort was the oral argument submitted by Richard V. Lindabury, of the defense. Mr. Lindabury started in slowly, but after he had warmed up to his work the spectators had an opportunity of seeing and hearing this remarkable legal genius at his best. Master of polished phrases and climaxes, inflection and



JUDGE JOSEPH BUFFINGTON

gestures, and possessing the various attributes which go to make up the born orator, he addressed the court for eight hours, never once permitting attention to be distracted or interest to flag. Only occasionally did he indulge in the fund of sarcasm which he has at his command. Throughout his presentation of the defense's case, he took the view that the existence of the Steel Corporation has been an unalloyed and undisguised blessing to the country in general and to the steel industry in particular. Mr. Lindabury recalled other anti-trust suits and stated that this is the only suit ever brought under the Sherman law in which not a single competitor testified to unfair practices on the part of the defendant company. The record of testimony in the case, he said, is a record of which the American people should be proud.

"If ever there was a record of clean doing and honorable business methods," said Mr. Lindabury, "we have it here. We are criticised for the Gary dinners. Instead of apologizing for them, the Steel Corporation is exceedingly proud of them and the results they made possible. The Gary dinners, to which 90 per cent of the iron and steel manufacturers of the country came to discuss the situation in the dark days of the panic of 1907, are a laurel crown in the history of the industry."

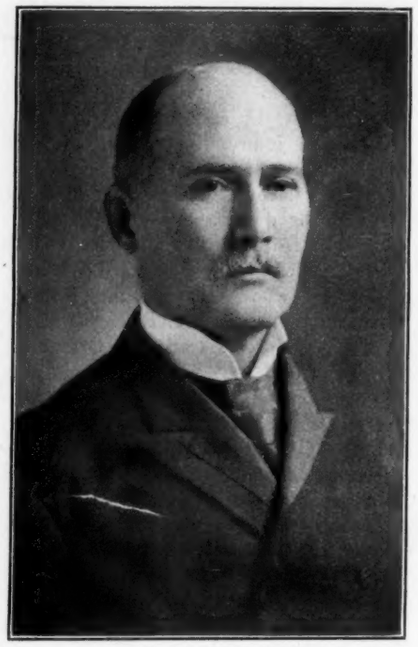
There was considerable argument during the proceedings as to a "Statement of the Case" which the Steel Corporation attorneys prepared. This volume, the defense informed the court, contained a summary of all the evidence taken during the hearings, whether such evidence was favorable or unfavorable to the Steel Corporation. To this statement the government objected strenuously, calling attention to a number of places in the volume where, it claimed, important evidence had been omitted. The court finally instructed the government attorneys to note in red ink on the margins of the pages of a copy of the "Statement of the Case" all such omissions of evidence.

One objection by the government, which caused considerable amusement to the attorneys for the defense, was the testimony of Percival Roberts Jr., who appeared as a witness both for the government and the Steel Corporation, and who occupied the stand for considerably more than a week. As an illustration of the character of Mr. Roberts' testimony, Mr. Colton declared that when questioned in regard to the Illinois Steel Co.'s rail capacity at a certain time he had stated it was 190,000 tons. Later on, he again took the stand and corrected this figure, substituting 80,000 tons. Mr. Colton stated the government looked upon Mr. Roberts as an unreliable witness and it recommended the court peruse his testimony with care.

### Judges Ask Questions

That the court intends to acquaint itself in no superficial manner with all the issues of the case, as well as with the metallurgy and history of the steel business, in order thus to hand down a fair and just decision, was shown by the character of the questions the judges asked from time to time. An illustration of this intention was afforded Monday during the presentation of evidence by David A. Reed, youngest of the attorneys for the defence. Mr. Reed, in response to the direct request of the court, submitted what virtually amounted to an elementary treatise on the steel business. He traced the manufacture of the metal from the conversion of ore into pig iron, down to the production of the various rolled sections, devoting particular attention to the acid and basic open-hearth and Bessemer processes. He defined and described the production of ingots, and of the semi-finished products such as blooms, slabs, billets and skelp, the judges interrupting him occasionally to get various points clearly fixed in their minds.

Mr. Reed's discourse on the metallurgy of the steel business was incidental to a protest he made to the government's contention that a company's ingot capacity is the true meas-



JUDGE J. B. McPHERSON

ure of the proportion of the steel business which it controls. He claimed an ingot is perhaps the most useless form of steel as a commodity for sale, and he declared he never heard of a purchase of ingots, as such. Rather, he said, a company's status in the trade should be determined from the percentage of the country's capacity it controls in each of the products which it sells.

Mr. Colton, at one point in his address to the court, declared "it is outrageous that domestic consumers were forced to pay more for steel than the prices at which foreign consumers could buy it here." He alluded to sales in the "dumping" period prior to 1900 and 1901 in which American steel makers sold their surplus production at whatever prices it would bring.

"How would you expect to get for-

RICHARD V. LINDABURY,
Attorney for Corporation

JOSEPH H. CHOATE,
Attorney for Corporation

DAVID A. REED,
Attorney for Corporation

H. C. COLTON,
Attorney for Government

FRANCIS LYNDE STETSON,
Attorney for Corporation

JACOB M. DICKINSON,
Attorney for Government

JOHN G. JOHNSON,
Attorney for Corporation

CORDENIO A. SEVERANCE,
Attorney for Corporation

RAYNAL C. BOLLING,
Attorney for Corporation

eign trade unless you reduced prices to meet competition in the foreign market?" interrupted Judge Buffington.

Mr. Colton did not answer this question directly, but said that prices here should be reduced, rather than that the manufacturers should sell abroad.

"You mean the manufacturers should reduce prices here despite the fact that the demand here is not great enough to absorb the supply?" pursued Judge Buffington.

"Yes, the lower price would create a demand," replied Mr. Colton.

"We thank you for your explanation," said the judge settling back comfortably in his chair.

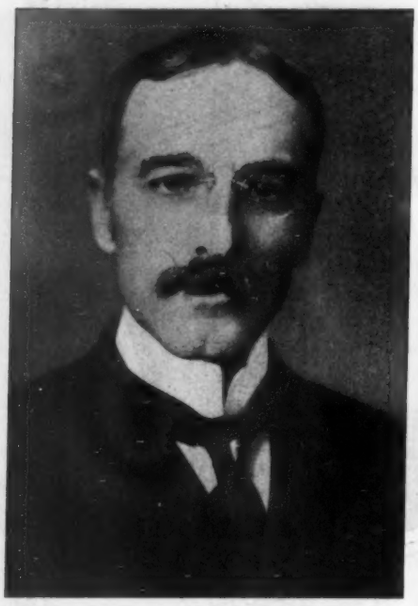
On another occasion, Mr. Colton was talking about the "Combination which controlled rail prices," when Judge Buffington interrupted him as follows:

"I understand it has been stated in this case that the Pennsylvania railroad controls the Cambria and Pennsylvania Steel companies. Will you explain how it is that the Pennsylvania railroad permits these companies to charge an unreasonable price for rails?"

"Perhaps it may be that the Pennsylvania railroad secured control of these companies in order to protect itself from the rail combination," replied Mr. Colton.

# THE FOUR PRESIDING JUDGES

From the right of the bench to the left the judges sat as follows: Judge McPherson, Judge Buffington, Judge Hunt and Judge Woolley. These eminent jurists appeared alike only in the judicial raiment which they wore.



JUDGE WILLIAM H. HUNT

Judges McPherson and Buffington, compared to Judges Hunt and Woolley, were the restless members of the court; they shifted their positions frequently, sometimes rocked to and fro in their high, square-backed chairs, and occasionally got up to pace back and forth for a while. They also questioned the attorneys more frequently than the other two judges. Judge McPherson is a well-built man of medium height whose face, in addition to seriousness and gravity, reflects a sense of humor. Judge Buffington is a smaller, more active man. Cool, urbane, kindly and tactful, he questioned the attorneys without a trace of sternness. Judge Hunt is of about the same height as Judge Buffington, but possesses an entirely different personality. He is of the ascetic type and never smiled. He seldom changed his position, and listened to the attorneys with unquavering attention; when he interrupted the speaker, which was seldom, he leaned forward, issuing his words in quick, staccato fashion, and framing his sentences with precision. Judge Woolley, the youngest member of the court, never uttered a word during the court proceedings. He is a big man, of the Teutonic type, grave, but good-natured.

### Judge Woolley

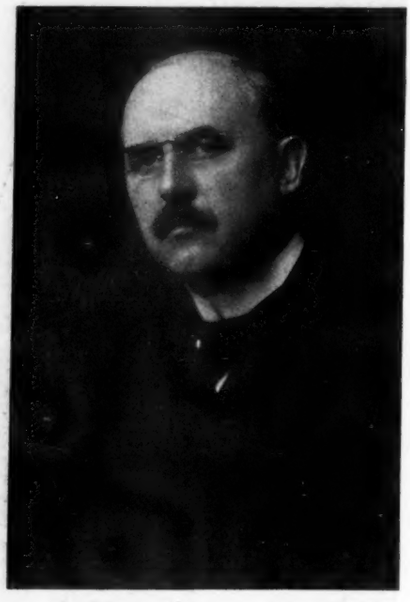
Judge Victor B. Woolley was born on March 29, 1867, and received his education at Delaware college and at Harvard law school. He was admitted to the Delaware bar in 1890 and soon gained prominence as an attorney in New Castle county. In 1909 he was appointed to the supreme court of Delaware. He is the youngest member of the United States Circuit Court of Appeals, having been appointed to that court for the third circuit on Aug. 14, 1914. He is the successor to Judge Gray.

### John B. McPherson

Judge John B. McPherson is the son of a distinguished jurist and was born Nov. 5, 1846. He graduated from Princeton in 1866. After studying law at Harrisburg, Pa., and Chicago, he was admitted to the bar at Harrisburg in January, 1870. Four years later, he was elected district attorney. In 1882, he received his first judicial appointment, it being to the bench of the twelfth judicial district of Pennsylvania. He served in this capacity until 1899, when President McKinley appointed him United States judge for the eastern district of Pennsylvania. His promotion to the United States circuit court came about two years ago and was regarded as a tribute to brilliant service in the lower courts.

### Judge Joseph Buffington

Judge Joseph Buffington was born in Kittanning, Pa., Sept. 5, 1855. After his earlier education in his home town, he attended Trinity College of Connecticut and was graduated with a degree of B. A. in 1875. In 1878 he was admitted to the bar, and practiced law in Kittanning until 1892, when he was appointed United States district judge for the western district of Pennsylvania. He continued in that office until 1896, when he was appointed judge of the



JUDGE VICTOR B. WOOLLEY

United States circuit court. He continued in that office until 1906, when he was appointed judge of the United States circuit court of appeals, which office he now holds. Judge Buffington, during his long service on the bench, has presided over some of the most intricate legal contests involving much technical matter, and particularly affecting the iron and steel industry. His decisions have always been regarded as of the highest character.

### Judge Wm. H. Hunt

Judge Wm. H. Hunt was born in New Orleans, in 1857. He entered Yale university in the class of 1878, but ill health prevented his graduation. He was collector of customs of Montana and Idaho from 1855 to 1887, a member of the Montana constitutional convention in 1884 and was elected a mem-

ber of the Montana Legislature in 1889. From 1894 to 1900, he was a justice of the supreme court in Montana. In May, 1900, he was appointed secretary of Porto Rico. In August, 1901, he was appointed governor of Porto Rico and filled this office until July 4, 1904. From 1904 to 1910, he was United States district judge in Montana and from January, 1910, to February, 1911, associate judge of the United States court of customs appeals, being appointed in December, 1910, as an additional United States Circuit Judge. He also was an associate judge of the United States commerce court for three years. His home is in Helena, Montana.

## Interesting Papers

Several papers of interest to the steel trade will be read at meetings this year under the auspices of the department of chemical engineering of the Mellon Institute of the University of Pittsburgh, Pittsburgh. The program includes the following papers: "Clays and Refractory Materials," Albert V. Bleininger, the United States Bureau of Standards, Pittsburgh, and Ross C. Purdy of the Norton Co., Worcester, Mass.; "The Manufacturer of Steel Tubing," F. N. Speller, the National Tube Co., Pittsburgh; "Vanadium Alloys," Dr. Geo. L. Norris, the American Vanadium Co., Pittsburgh; "Some Special Methods of Pyrometry," Dr. S. H. Stupakoff, director of the Stupakoff Laboratories, Pittsburgh; "Physical Chemistry in the Service of the Industries," Dr. M. A. Rosanoff, of the Mellon Institute. Dr. B. T. Brooks, of the department of engineering and research, is in charge of the series of lectures.

## New Rates in Michigan

Detroit, Oct. 26.—The five per cent increase in freight rates allowed by the Michigan railway commission in its recent decision in the class rate case, went into effect today together with the revised schedules allowed several weeks ago by the interstate commerce commission to roads in central freight territory.

"I believe the carriers are perfectly willing to give the new rates a fair test; if they prove inadequate we shall have to petition for a further increase," declared W. C. Rowley, general freight agent of the Michigan Central.

New equipment is being installed in the department of metallurgy at the University of Pittsburgh, Pittsburgh.

# German Patents Ignored

### Toronto Carpet Co. Will Make Machines and Expects to Find a Market in the United States

Toronto, Oct. 27.—The carpet manufacturing industry in Toronto has received a stimulus owing to the impossibility of filling orders by Germany and Austria. The Toronto Carpet Co. has German one-piece rug looms and Austrian carding machines in operation, turning out a class of goods which it was hitherto generally supposed could only be purchased abroad. Now that the patents on these machines have been rescinded by the government, the company has decided to reproduce the machines themselves, and expect to find a market in the United States for one-piece rug looms, valued at $2,500 each, as it is stated that experiments to produce machines which will weave a rug in one piece there have been unsuccessful. The German manufacturers hav made no effort to sell these looms abroad, and it is stated that there are none on the continent except in Toronto.

The output of the Dominion Steel Corporation for September shows a great falling off as compared with the corresponding month last year. The rail and bar mills were not in operation, the output of pig iron was 5,208 tons, as against 32,453, and steel ingots 4,936 tons, as against 30,492. There is a satisfactory increase, however, in wire rods, which were produced to the amount of 4,501 tons, and wire and wire products 4,300 tons, as compared with 2,472 and 3,706 tons respectively in September, 1913. The regular quarterly dividend of 1½ per cent was declared on preferred stock.

The International Harvester Co., of Hamilton, is recommencing operations in a small way beginning with the foundry department. Other departments will resume shortly and the work will be distributed so as to give as many as possible part-time employment.

## Will Close Temporarily

The United Steel Co., Canton, O., is sending out a notice to its customers that it will be necessary to shut down its open-hearth and blooming mill departments from Dec. 1 to Jan. 14 or Feb. 1, in order that it may install a new universal mill. The customers are asked to send in specifications at once and allow the company either to roll or ship billets, slabs, plates, sheet bars and forging billets, in both common or alloy steels, prior to the date of shut down. The bar mills and shafting plant will remain in continuous operation, and such products as vanadium and nickel steel merchant bars, forging billets and vanadium and nickel steel cold drawn shafting can be furnished at any time. The company will have a wider range of practice and a greater tonnage capacity after the installation of the new mill.

## In the Woods

### Waiting for Return of Prosperity—Pacific Coast Conditions

Seattle, Oct. 26.—The plants in the northwest are still marking time waiting for the readjustment which is supposed to be on its way. Sporadic instances give some indication that this readjustment will be along within a reasonable time. But it is just as well to keep whistling for a while as we are still in the woods.

The shipments of foreign steel prior to the time the opening of hostilities in Europe cut off the source of supply do not seem to have made any impression on the market here. As the experiment has not yet been thoroughly tried out, it is probable that there was no particular rush to place orders after the initial shipments so far as their particular portion of the coast is concerned. As an indication that the experiment is a slow process and gives indication of not panning out, there seems to be considerable difficulty in disposing of the stock. From a shipment of 400 tons or thereabouts of structural shapes received about eight months ago, 144 tons have been sold, although so far as Seattle is concerned the demand has been what might be considered good.

## Carbon Elects Officers

At the annual meeting of the stockholders of the Carbon Steel Co., Pittsburgh, Oct. 19, the following directors were elected: Charles McKnight, George S. Macrum, C. E. Middleton, D. R. Wilson, of Pittsburgh; Gilbert G. Thorne, Edward C. Hoyt and Edward F. Slayback, of New York. Officers were elected as follows: President, Charles McKnight; vice presidents, Gilbert G. Thorne and George S. Macrum; treasurer, D. R. Wilson; secretary, W. W. Noble. Messrs. McKnight, Macrum, Middleton and Wilson constitute the executive committee.

# TIPS FOR NEW BUSINESS

**Equipment needs of the Iron and Steel works, Machine shops, Foundries and other Metal Working plants**

In the eastern machinery market during the past week there has been an absolute lack of important events as far as domestic business is concerned. Most machinery sellers, however, are more cheerful than for several weeks past, owing to an improvement in the domestic demand, which, considered in conjunction with the large orders placed for export, has given a better tone to the market. The business all was in small lots, generally one or two machines, and was placed by manufacturers in many different lines, showing that the improvement was not confined to any one special industry. One large seller in New York reports having booked on an average of five to ten orders of this kind every day during the week, and the receipt of a correspondingly improved volume of inquiry. Naturally business of such a character is much more desirable to sellers than the booking of one or two large orders. The export demand continues very active. The latest development is the receipt by an exporter here of orders for a total of 1,000 grinding machines, destined for Germany, France and Russia. A portion of this lot already has been placed and the remainder is being figured on. Some very large orders also have been placed for milling machines and automatic screw machines for export to England, Germany and Russia. Instructions in regard to how shipments are to be made to Germany have not yet been received, but the machines probably will be shipped either by way of Rotterdam or Copenhagen. Of the lathe business previously referred to, it develops that in all some 1,700 lathes already have been placed for export, and further inquiries are pending. There is reason to believe that this export demand is by no means at an end. The business already placed from the countries engaged in the war has given to the plants of many manufacturers of machine tools a "boom times" aspect, some of these plants now operating day and night.

In Pittsburgh, machine tool builders appear more cheerful as a result of the heavy buying in adjacent territory for export shipment. While the domestic situation is no better, it is believed pending inquiries will be closed when the financial situation improves. The Franklin Sheet Metal Works, Franklin, Pa., is contemplating the erection of a plant for the manufacture of stove and conductor pipe, gas furnaces, ornamental iron work, etc.; and the East Liverpool Traction & Light Co. expects to spend $30,000 for an extension to its property at East Liverpool, O. Electrical equipment manufacturers are bidding on electrical machinery and equipment for Turkey. Builders of heavy rolling mill equipment continue to operate at fairly satisfactory rates, although schedules have been reduced recently at one of the larger plants.

In the Chicago district, the evidences of improvement in the machine tool business apparent in some other sections of the country, are not reflected strongly. Some dealers have had machines, particularly lathes and automatic screw machines, called in from their floors to assist manufacturers in filling foreign orders. Second hand machinery continues to have the call and demand for this is greater than for new machinery. In Milwaukee some improvement is noted.

In Cincinnati, the principal inquiry is for 400 lathes for Stockholm, Sweden. Lathes have been in the greatest demand, the inquiries coming mostly from the countries at war. The smaller manufacturers of machine tools have shared this business with the larger ones. A few orders have been taken for milling machines for Europe. Machine tool builders on the whole are busier now than at any time since the first of the year, due principally to foreign orders. Domestic inquiry is very low and has been unsatisfactory for months. The second hand machinery market continues exceedingly dull.

## EASTERN STATES

AUGUSTA, ME.—Dallas Equipment Co. has been incorporated to make street cars and other cars and vehicles; $200,000 capital stock; John H. Pierce, Portland, Me., president.

BRANDON, VT.—Ground has been broken for B. W. Howland and Harry Coles' machine shop and garage on Rossiter street.

CAMBRIDGE, MASS.—Walsh Bros. have the general contract for the large steel and concrete factory building for Lever Brothers, soap manufacturers; plans include a loading platform of steel and concrete, 25 x 65 feet.

WORCESTER, MASS.—Spencer Wire Co. is erecting two additional buildings to be ready Dec. 1 and to cost about $50,000; each will be three stories, of brick and mill construction, the larger to be 60 x 230 feet, and the other 60 x 180 feet.

FARMINGTON, CONN. — Union Rolling Mill Co. has increased its capital from $250,000 to $600,000.

NEW HAVEN, CONN.—Sentinel Automatic Gas Appliances Co. has increased its capital from $100,000 to $200,000.

NEW HAVEN, CONN.—Standard Wash Tray Co. will erect a $10,000, one-story, 150 x 175-foot factory in Stiles street.

NORWICH, CONN.—Smith Bancroft Engine Co. has been incorporated;; $50,000 capital stock; by Roy Smith, Clarence L. Bancroft, New London, Conn.; Charles R. Arien, Boston; Frank H. Allen.

PUTNAM, CONN.—Manhasset Mfg. Co. started work on a two-story, 56 x 99-foot addition to its plant.

BATH, N. Y.—Bonds amounting to $30,000 have been sold for the construction of an electric light plant.

BUFFALO.—Standard Rolled Products Co. has increased its capital from $50,000 to $75,000.

BUFFALO.—Atlas Production Co., has been incorporated to make engines, boilers and tools; $50,000 capital stock; by George L. Schupp, George Nachtrieb, August C. Lehmann, Charles P. Nostrant, William A. Hyle.

NEW YORK.—Durex Chemical Works have been incorporated; $288,000 capital stock; by W. D. Gilman, H. E. Baer, M. Toch, 329 West Eighty-sixth street.

NEW YORK.—Diamond Door Hanger Co., hardware, metal articles, has been incorporated; $25,000 capital stock; A. R. Lotson Jr., R. O.

Showing one of our recent installations of Ayer & Lord Interior Wood Blocks. Name and address of concern on application.

# *Withstands Roughest Treatment!*

A flooring of Ayer & Lord Interior Wood Blocks will withstand the roughest treatment to which it can be subjected by the most severe shop service. Wear and tear that would soon put any other flooring out of commission has no other effect on an Ayer & Lord flooring than to make it more solid than ever. Let us explain ***"WHY!"***

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have many other very desirable features. These blocks make the most healthful and sanitary kind of a flooring; a flooring that is resilient, restful, silent, smooth and dry; a flooring that is dustless, and of the greatest economy. Consequently nearly all up-to-date concerns are installing them.

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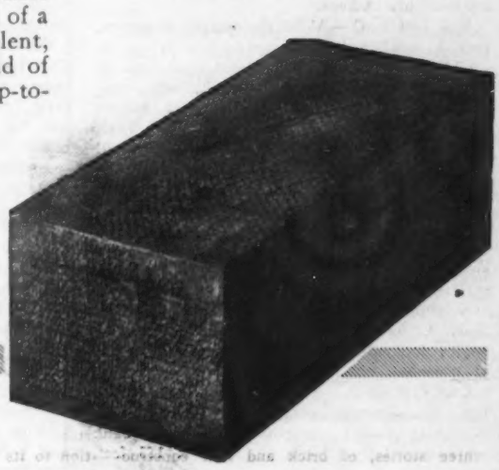

## Ayer & Lord Tie Company

**General Office: Railway Exchange, Chicago**

CLEVELAND, O.—801 Swetland Bldg.
KANSAS CITY, MO.—1117 Rialto Bldg.
ST. LOUIS, MO.—554 Pierce Bldg.
MEMPHIS, TENN.—1402 Exchange Bldg.
PHILADELPHIA, PA.—319 Perry Bldg.

L. Fay, W. W. Pickard, 55 Pineapple street, Brooklyn.

NEW YORK.—Keppler Glass Construction, Inc., general glass manufacturer, has been incorporated; $170,000 capital bonds; by Frederick L. Keppler, 101 Park avenue, Albert T. Otto, Henry S. Otto.

NEW YORK.—Maynicke & Fronke, architects for Jacob Ruppert, Inc., have filled plans for an 11-story, 73 x 114, 10-foot, fireproof stockhouse at 206-210 East Ninty-second street; estimated cost $150,000.

NEW YORK.—Chandler Engineering Corporation, patented articles, tools, machinery, has received it charter; $15 000 capital stock; E. F. Chandler, 132 Nassau street, New York; J. A. Korneld, H. S. North; incorporators.

POUGHKEEPSIE, N. Y.—Architect Dubois C. Carpenter is preparing plans for two additions to the Sedgwick Machine Co.; one to be a wood shop, the other a storehouse.

ALLENTOWN, PA.—F. B. Franks, president of the Nazareth Brick Co., says the plant near Nazareth, which was recently damaged by fire, will be rebuilt.

CHESTER, PA. — Tindel-Morris Co. has increased its debt to $200,000.

ERIE, PA.—Structural steel is being contracted for by Nathan Cohen for a $95,000, five-story store and office building; foundations are being excavated.

ERIE, PA.—Farrar Smoke Eliminator Co. has been incorporated; $10,000 capital stock; James W. Farrar, William C. Beers, Thomas M. Hemphill, Harry B. Farrar, Dwight C. Ely, George B. Taylor.

ERIE, PA.—County commissioners and state highway department will spend about $250,000 for several concrete re-inforced steel arches and bridges to eliminate grade crossing along the Lake Shore railroad in Erie county; plans about completed.

ERIE, PA.—Several hundred miles of wire will be stretched for light and current lines between this city and county towns upon the consolidation of lighting companies, among them being the Erie Lighting Co.; charters have been asked for companies in six or seven smaller towns.

PITTSBURGH.—William C. Blanchard has purchased a lot and will erect a garage to cost about $40,000.

UNIONTOWN, PA. — Consolidated Coke Co. has increased its capital from $5,000 to $200,000 and its debt limit to $600,000.

## CENTRAL STATES

AKRON, O.—Star Rubber Co., maker has been incorporated; $1,000 capital stock; by George W. Carmichael, J. W. Miller, D. B. Duff, W. E. Wright, W. H. Debney.

ATHENS, O. — Close Brothers, Chicago, have loaned $100,000 to the Rocking Sunday Creek Traction Co., which now will extend its line into Athens.

BUCYRUS, O.—Alpha Co., maker of pumps, seek a location in Bucyrus.

CINCINNATI.—United States Cast Iron & Foundry Co., Burlington, N. J., will soon build several additions to its pant at Addyston, O.; plans call for six buildings of brick and steel, but it is not certain that they will all be built at once.

CLEVELAND.—Commissioner of purchases and supplies will receive bids until noon, Nov. 6 for auto trucks for the municipal electric light department, also for auxiliary air compressor for that department.

CLEVELAND.—Commissioner of purchases and supplies will receive bids until noon, Nov. 4, for a motor-driven electric hoisting engine for public utilities department, division of water.

CLEVELAND. — Crowell-Lundoff-Little Co. has the general contract for the Union National Bank's proposed $600,000 bank building, 200 feet high, about 45 x 165 feet, to be erected on the present site of the institution, 308 Euclid avenue; work will start before spring.

CLEVELAND.—National Hing Co., maker, has been incorporated; $50,000 capital stock; by F. J. Townsend, H. L. Parmenter, O. O. Vrooman, J. E. Splittorf, C. E. Mellen.

CLYDE, O.—McGraw Tire & Rubber Co., East Palestine, O., and a committee of Clyde business men are negotiating with regard to the location of a plant in this city.

COLUMBUS, O.—Springfield Gas, Coke & Pipe Line Co. has been incorporated; $125,000 capital stock; by L. S. Addison, T. H. Clark, A. C. Harney, C. H. Jay, E. V. Mahaffey.

FRANKLIN, O.—Franklin Advance Machine Co. has been incorporated; $10,000; by J. G. Vance, J. J. Woisner, H. Wade, P. H. Rue, J. G. Weisner.

MARION, O. — American Malleable Castings Co., will erect a $6,600 annealing building in West Center street.

NEW WASHINGTON, O.—Reynolds Aluminum Co. has increased its capital from $10,000 to $20,000.

TOLEDO, O.—Charles J. Sanzenbach, county auditor, will receive bids until 10 a. m., Nov. 6 for a heating and lighting plant at the Children's Home.

WESTERVILLE, O.—Scharf Gearless Motor Car Co. changes location to Richwood, O.

NEW MARTINSVILLE, W. VA.—County court will let the contract for a bridge at the head of Point Pleasant, two miles from this city.

PARKERSBURG, W. VA.—B. & O. railroad is planning a bridge across the Kanawha river near this city.

INDIANAPOLIS, IND. — Electric Metals Co. has been incorporated; to make electric furnaces; $10,000 capital stock; by H. H. Buckman Jr., George A. Pritchard, M. R. Buckman.

ROANN, IND.—Roann Light & Power Co. has been incorporated; $10,000 capital stock; by George H. Brodbeck, Dow VanBuskirk, F. R. Shuler, et al.

PERU, IND. — A company headed by Charles E. Johnston, is about to erect a needle factory in this city.

COLFAX, ILL.—County commissioners and McDean county commissioners are considering a bridge over the North Fork of Salt Creek on the county line.

HARTSBURG, ILL.—Orvil Light, Power & Water Co. has been incorporated; $4,000 capital stock; by Daniel Van Gerpen, James H. Butler, George A. Shirley.

MATTOON, ILL.—Fresh Air Window Shade Device Co. has been incorporated; $40,000; by R. T. Eddy, Gus Schlicher, J. A. Berchtold.

OAK PARK, ILL.—Westcott Engineering Co., 10 South LaSalle street, Chicago, is in charge of construction of a club house for the Oak Park Country Club to cost $50,000; it will be constructed of brick and tile with considerable steel, 75 x 195 feet.

ALMA, MICH.—Alma Standard Foundry & Mfg. Co. will erect additions to its plant for the manufacture of furnaces.

BATTLE CREEK, MICH.—M. J. Morehouse, 343 South Dearborn street, Chicago, is preparing plans for a power plant to develop 7,000 horsepower, for the Kellogg Corn Flakes Co., in this city, it will include several buildings of reinforced concrete construction to house the latest type of equipment; total cost is estimated at $250,000.

BAY CITY, MICH.—United States Pipe Co. has purchased a half acre for the erection of two buildings early next spring; one will be 40 x 60 feet, the other 25 x 100 feet.

CALUMET, MICH. — George L. Price, secretary of the Copper Country Commercial club, is negotiating with a horseshoe manufacturing concern desiring to locate in this district.

DETROIT.—Disco Electric Starter Co. has been incorporated; $60,000; by Jacob Dornbos, Henry J. Dornbos, Charles J. Carpenter.

DETROIT, MICH.—General Spring & Wire Co. has been incorporated; $10,000; by Joseph H. Clark, August and Alfred H. Peterson.

DETROIT, MICH.—Detroit Boiler Specialty Co. has been incorporated; $15,000 capital stock; by William E. H. Long, W. S. Reynolds, David M. Kerr.

GRAND RAPIDS, MICH.—Kalamazoo Interurban railway soon will be able to construct its proposed 60 x 600-foot freight house and possibly a passenger station.

HIGHLAND PARK, MICH. — John H. Baer, Port Huron, Mich., has been awarded the contract for constructing a steel intake crib and laying a cast iron water main about 2,500 feet long; his bid was $49,259.

KALAMAZOO, MICH.—C. H. Dutton Boiler Works will erect a one-story, 40 x 100-foot, brick addition.

BAYFIELD, WIS.—Bay Iron Works will install a full foundry outfit shortly.

BELLEVILLE, WIS. — Valecia Condensed Milk Co. has awarded the general contract for the construction of a new milk condensing plant, 60 x 160 feet, two-stories, to the Denmark Construction Co. of Madison, Wis., it will be of brick and reinforced concrete construction.

BELOIT, WIS. — Fairbanks-Morse Mfg. Co.'s power house will be remodeled and prepared for new boilers which will be installed next spring.

DEPERE, WIS.—Comon council has received a report from the state bridge engineer, that the present Long bridge over the Fox river can be repaired at a cost of $15,000, but recommending that a new bridge be constructed; no decision has yet been made.

DODGEVILLE, WIS.—A $6,000 cold storage plant will be erected by the county board of supervisors at the almhouse; O. G. Rewey is in charge.

GREEN BAY, WIS.—Fabry Construction Co. was awarded the general contract for the construction of a three-story addition, 40 x 170 feet, of steel, brick and concrete, to the plant of the John Hoberg Paper Co.

MADISON, WIS. — Heibel Bottling Co. will build a $20,000 plant on East Washington street; plans have been completed by T. L. Kronenberg, architect.

MADISON, WIS.—J. W. Utley Construction Co., Milwaukee, was awarded the general contract for building a $50,000 fireproof garage and repair shop, four stories, 40 x 120 feet, for the L. F. Schoelkopf Automobile Co.

MADISON, WIS.—Chicago & North-Western Railroad Co. has given notice to the state railroad comimssion of its intention to build a 16-mile single-track extension from Oconto county into Langdale county, and an eight-mile branch in Langdale county.

MADISON, WIS.—State board of control, M. J. Tappins, secretary, has engaged Robt. A. Messmer & Bros., Milwaukee, as architects, and Vaughn, Meyer & Sweet, Milwaukee, as engineers on the $1,000,000 state home for feebleminded and epileptics project at Union Grove, Racine county, Wis.; first unit, costing $250,000, will be started about Dec. 1; it will contain the power plant required for the complete group.

MANITOWOC, WIS.—William Dicke Motor Car Co. will erect a modern garage and repair shop of reinforced concrete, 60 x 100 feet, one-story high, and convert its present garage into a warehouse and stock room.

MANITOWOC, WIS.—Lehigh Valley Coal Co. has purchased additional acreage on the

Manitowoc river and will spend $30,000 in erecting a new dock and rigs, electrically operated.

MILWAUKEE.—Modern Stamping & Mfg. Co. has been incorporated; $150,000; by J. P. Foley, H. F. Friedrich, A. C. Jorgensen; Paul D. Durant, attorney.

MILWAUKEE. — Architect C. F. Ringer completed plans for a $20,000 plant for the Sheboygan Cigar Box & Lumber Mfg. Co., which was destroyed by fire in April.

MILWAUKEE.—A permit has been granted to the Milwaukee Steel Foundry Co., 157-161 Virginia street, to erect a $9,000 addition, 16 x 138 feet, of steel and brick.

MILWAUKEE, WIS.—Campaign to raise $150,000 for a new building for St. Catherine's Home for Working Girls is under way; plans for a three-story brick and concrete building, 82 x 150 feet, have been completed by Brust & Philipp.

MILWAUKEE, WIS.—Modern Stamping & Mfg. Co., recently organized and incorporated with $150,000 capital by A. C. Jorgenson and J. B. Foley, plans a plant for the production of die castings, steel stampings, tools and machinery.

MILWAUKEE, WIS.—B. J. Johnson Soap Co., Fourth and Fowler streets, is having plans prepared by Lockwood, Greene & Co., engineers, 38 South Dearborn street, Chicago, for a $100,000 warehouse to be erected next spring; it will be of brick, steel and reinforced concrete, 115 x 135 feet, six stories high.

MILWAUKEE. — Harley-Davidson Motor Co. broke ground this week for an $18,000 reinforced concrete addition to be used for the sheet metal department, producing tanks, sidecar bodies and other light sheet parts. When this building is completed an additional story will be erected on factory No. 6.

## SOUTHERN STATES

RALEIGH, N. C.—Concord Foundry & Machine Co. is enlarging its plant and installing new machinery.

ALLENDALE, S. C. — City will receive bids until Nov. 18 for the construction of an electric light plant, waterworks and sanitary sewers; H. S. Jaudon Engineering Co., Savannah, Ga., engineer.

FLORENCE, S. C.—Carolina Central Electric Co. has increased its capital from $500,000 to $800,000.

DANIELSVILLE, GA. — County commissioner received bids Oct. 21 for a steel bridge over Broad river near Carleton consisting of two 172-foot spans and two 66-foot spans.

ROSEVILLE, GA.—Lokout Bending Co., staves, spokes, etc., has been incorporated; $15,000; by F. C. Baumgartner, H. C. Barber, et al.

FORT LAUDERDALE, FLA.—Z. T. Merritt, clerk of county commissioners, will receive bids until Nov. 3 for a steel draw bridge over New river at Fort Lauderdale; 28 feet wide, draw to leave channel 60 feet wide.

TAMPA, FLA.—N. Geraci & Co. will let a contract shortly for the erection of a cold storage plant.

ATHENS, ALA.—Excelsior Electric & Steam Laundry has been incorporated; $5,000; by Charles I. Smith, H. A. Thompson, et al.

BIRMINGHAM, ALA. — A $75,000 ice plant will be constructed immediately on Avenue A by the North State Engineering & Construction Co.

BIRMINGHAM, ALA.—City voted $5,000,000 bonds for water works to include pumping stations with pumps for 28,000,000 gallons daily; reservoir on Shades mountain with capacity 30,000,000 gallons; reservoir and filter plants near East Irondale.

GREENWOOD, MISS.—Delta Mfg. Co. has been incorporated; $100,000; by S. L. Rainey, H. A. Minor, Jr., et al.

BUNKIE, LA.—W. L. Thompson, consulting engineer, Boyce, La., has plans about completed for the Bunkie Ice Co.'s electric lighting plant, to cost about $15,000.

HOUMA, LA.—City will receive bids until Nov. 6 for a 3-inch vertical discharge centrifugal pump for minimum capacity of 2,000 gallons per minute against total head of 150 feet direct-connected to 20-horsepower, 2,200-volt, 3-phase, 60-cycle motor, having starter equipped with no voltage release; contractor will furnish pipe, electric fitting, etc.

## Best New Business Tips of the Week

*BELOW will be found the most important new business items of the week boiled down for the busy reader. They are culled from a great mass of less important information for your benefit. Even if your time is limited, look over this list every week.*

*Franklin Sheet Metal Works, Franklin, Pa., will erect a plant for the manufacture of gas furnaces, ornamental iron work, stove pipe, conductor pipe, etc. F. J. Pickard is president.*

*Huntington Glass Brick Works will erect an 88 x 860-foot factory at Huntington, W. Va. F. D. Buskirk is one of the organizers.*

*J. J. Nordman, secretary of the foreign trades commission, Pittsburgh, has plans and specifications for an electric lighting system for the capital of the vilayet of Sivas, Turkey; specifications cover a large list of electrical machinery and equipment.*

*Modern Stamping & Mfg. Co., Milwaukee, recently incorporated for $150,000 by A. C. Jorgenson and J. B. Foley, plans a plant for the production of die castings, steel stampings, tools and machinery.*

*State board of control, Madison, Wis., M. J. Tappins, secretary, has engaged Robert A. Messmer & Bros., Milwaukee, as architects, and Vaughn, Meyer & Sweet, Milwaukee, as engineers on the $1,000,000 state home for the feebleminded and epileptics at Union Grove, Racine county, Wis. First unit, costing $250,000, will be started about Dec. 1; it will contain the power plant required for the complete group.*

*Crowell-Ludoff-Little Co., Cleveland, has the general contract for the Union National Bank's proposed $600,000 bank building, 200 feet high, about 45 x 165 feet, to be erected on the present site of the institution, 308 Euclid avenue, Cleveland.*

*Warren Tank & Boiler Co., Warren, O., has completed plans for an additional boiler shop.*

*East Liverpool Traction & Light Co., East Liverpool, O., will spend $30,000 for feed water softening plant, steam emergency pumps, extension to boiler plant, etc. C. A. Smith is president.*

## WESTERN STATES

COFFEYVILLE, KAN.—Attorney George Campbell has drawn incorporation papers for the Acme Foundry & Machine Co., which has purchased the old Coffeyville foundry; capital stock is placed at $6,000.

BILLINGS, MONT.—W. B. Snyder, general manager of the Billings Gas Co., says the company will erect a 200,000-cubic foot capacity holder in the spring.

BILLINGS, MONT.—County will vote on a $200,000 bond issue in November for the construction of bridges over the Yellowstone river and the installation of a new span in a bridge near this city.

GREAT FALLS, MONT.—Montana Garment Co. will erect a factory, to be ready for operation about Jan. 1.

GREAT FALLS, MONT.—G. W. Morrow, general land and townsite agent of the Milwaukee railroad has awarded a contract for machinery for an electric light plant at Geraldine; when this is completed line will be extended to Square Butte; plans include light plants for Geraldine, Highwood, Denton, Roy Winnifred and Winnett.

PECK, IDA.—Peck Milling & Elevator Co. is to be incorporated for $50,000 for the construction of a flour mill and electric light plant to cost about $11,000; a turbine will be used to generate power.

BELLINGHAM, WASH.—Bellingham-Alaska Trade & Transportation Co. will build a light draft vessel capable of carrying 1,000 tons; E. R. Gawley is head of the company.

CATHALAMET, WASH.—Sum of $42,000 has been voted for constructing a municipal lighting plant.

CHEHALIS, WASH.—Fire did about $2,500 damage to Elmer Meritt's sawmill; mill will be rebuilt.

LOOMIS, WASH.—Reported Dr. Barton, Los Angles, Cal., will install an electric smelter in Loomis; he has an option to work the Palmer Mountain tunnel and Summit mines.

SEATTLE, WASH.—F. H. Linthicum, of the National Steel Foundries, Milwaukee, has been making an investigation in the northwest which give basis for a report that a branch factory will probably be established in this district.

SEATTLE, WASH.—Eagle Harbor Transportation Co., Seattle, is planning to call for bids on the construction of a 130-foot passenger steamboat to cost about $38,000; engines are to be triple expansion, 800 horsepower; L. H. Coolidge, naval architect, prepared the plans.

SEATTLE, WASH. — W. B. Henderson, bureau of foreign and domestic commerce, is in touch with a consular officer in the far east who state that steel for 300 or 400 feet of bridge building will be required in his district shortly. Cable has also been received from an American consul in Russia stating that a person in his district desires prices delivered on electric bulbs, zinc, lead and ferromanganese from reliable American firms.

SPOKANE, WASH.—Fire damaged the five-story warehouse of the Holt Mfg. Co., causing a loss estimated at $75,000; building was filled with agricultural machinery and parts valued at $50,000.

TACOMA, WASH. — Council has authorized W. B. Collins, city light department, to purchase $20,000 worth of incandescent lamps.

EUGENE, ORE.—Devereaux & Tripp are negotiating with timber owners for the construction of a logging railroad up Lost Creek; line for road has been surveyed.

# IRON AND STEEL PRICES

**Corrected up to Tuesday noon**

## PIG IRON

(Delivery This Year.)

| | |
|---|---|
| Bessemer, valley | $14.00 |
| Bessemer, Pittsburgh | 14.90 |
| Basic, Pittsburgh | 13.65 |
| Basic, eastern Pa. | 14.00 |
| Malleable, Pittsburgh | 13.65 to 14.15 |
| Malleable, Chicago | 13.00 to 13.50 |
| Malleable, Philadelphia | 14.50 to 15.00 |
| Malleable, Buffalo | 12.00 to 12.50 |
| No. 1X Philadelphia | 14.75 to 15.00 |
| No. 2 foundry, Pittsburgh | 13.65 to 14.15 |
| No. 2 foundry, Cleveland | 13.75 |
| No. 2 foundry, Ironton | 13.00 to 13.50 |
| No. 2 foundry, Chicago | 13.00 to 13.50 |
| No. 2X foundry, Philadelphia | 14.50 to 14.75 |
| No. 2X fdy., (N. J. tidewater) | 14.00 to 14.25 |
| No. 2X foundry, Buffalo | 12.00 to 12.50 |
| No. 2 plain, Philadelphia | 14.25 to 14.50 |
| No. 2 plain, (N. J. tidewater) | 13.75 to 14.00 |
| No. 2 plain, Buffalo | 12.00 to 12.25 |
| No. 2 southern, Birmingham | 10.00 to 10.50 |
| No. 2 southern, Cincinnati | 13.25 to 13.75 |
| No. 2 southern, Chicago | 14.00 to 14.25 |
| No. 2 southern, Phila. delivery | 14.50 to 15.00 |
| No. 2 southern, Cleveland | 14.00 to 14.50 |
| No. 2 south'n, New York, docks | 14.25 to 14.50 |
| No. 2 southern Boston docks | 14.25 to 14.50 |
| No. 2 south'n interior New Eng. | 15.00 to 16.00 |
| No. 2 southern, St. Louis | 14.00 to 14.25 |
| Virginia No. 2X furnace | 12.25 to 12.75 |
| Virginia 2X, Philadelphia | 15.00 to 15.25 |
| Virginia 2X, Jersey City | 15.25 to 15.50 |
| Virginia, 2X, New Eng. interior | 16.00 to 16.25 |
| Gray forge, (eastern Pa.) | 13.50 to 13.75 |
| Gray forge, Pittsburgh | 13.40 to 13.65 |
| Gray forge, Birmingham | 9.00 to 9.50 |
| Silveries, 8 per cent, Cleveland | 17.55 |
| Silveries, 5 per cent Birmingh'm | 12.50 |
| Silveries, 5 per cent, Chicago | 16.35 |
| Standard low phos., Phil. | 21.00 to 21.50 |
| Lebanon low phos., furnace | 17.00 to 17.50 |
| Low phos., Pittsburgh | 21.15 to 21.40 |
| Charcoal, Lake Superior, Chgo., Nos. 1 to 4 | 15.75 to 16.50 |
| Charcoal, Buffalo | 15.75 to 16.75 |
| Charcoal, Birmingham | 25.00 |

## IRON ORE

(Lower lake ports.)

| | |
|---|---|
| Old range Bessemer, 55 per cent | $3.75 |
| Mesabi Bessemer, 55 per cent | 3.50 |
| Old range, non-Bess., 51½ per cent | 3.00 |
| Mesabi non-Bessemer, 51½ per cent | 2.85 |

(Per unit Philadelphia.)

| | |
|---|---|
| Foreign Bess., 50 to 65 per cent | 7c |
| Foreign non-Bess., 50 to 65 per cent | 7c |

## COKE

(At the ovens.)

| | |
|---|---|
| Connellsville furnace | $1.65 to 1.75 |
| Connellsville fur. contr. | 1.65 to 1.75 |
| Connellsville foundry | 2.15 to 2.40 |
| Connellsville fdy., contr. | 2.25 to 2.50 |
| Wise county furnace | 1.85 to 2.10 |
| Wise county foundry | 2.25 to 2.75 |
| Pocahontas furnace | 1.80 to 2.05 |
| Pocahontas foundry | 2.25 to 2.40 |
| New River, foundry | 2.75 to 3.50 |
| New River, furnace | 2.20 to 2.35 |

## FERRO-ALLOYS

| | |
|---|---|
| Ferro-manganese, Baltimore | $68.00 |
| Ferro-silicon, 50 per cent, Pbgh. | 71.00 to 73.00 |
| Ferro-silicon, 50 per cent, Phila. | 71.00 to 73.00 |
| Ferro-sil., 12 to 13 per cent, Pgh. | 22.90 |
| Ferro-sil., 11 to 12 per cent, Pgh. | 21.90 |
| Ferro-sil., 10 to 11 per cent, Pgh. | 20.90 |
| Ferro-sil., 9 to 10 per cent, Pgh. | 19.90 |
| Ferro-carbon titanium, carloads, per lb. | 8c to 12½c |

## SEMI-FINISHED STEEL

| | |
|---|---|
| Open-hearth billets, Phila. | $22.40 |
| Forging billets, Phila. | 25.40 to 26.40 |
| Forging billets, Pbgh. (nom.) | 25.00 |
| Wire rods, Pittsburgh | 26.00 |
| Billets, Pbgh. | 20.00 |
| Billets, Youngstown | 19.50 |
| Sheet bars, Pbgh. | 21.00 |
| Sheet bars, Youngstown | 20.00 to 20.50 |

## RAILS AND TRACK MATERIAL

| | |
|---|---|
| Stand. Bess., rails, Pbgh. | 1.25c |
| Stand. open-hearth rails, Pbgh. | 1.34c |
| Light rails, 8 lbs., Pbgh. or Chi. | 1.40c |
| Lgt. rails, 12 lbs., Pbgh. or Chgo. | 1.35c |
| Lgt. rails, 16 to 20 lb., Pbgh. or Chicago | 1.30c |
| Lgt. rails, 25 to 45 lbs., Pbgh. or Chicago | 1.25c |
| Relaying rails, standard, Chgo. | $23.00 to 24.00 |
| Relaying rails, light, Chicago | 21.50 to 22.50 |
| Angle bars, st. sect. Pbgh. base | 1.50c |
| Angle bars, st. sections, Chgo. | 1.50c |
| Spikes, railroad, Pbgh. | 1.40c to 1.45c |
| Spikes, railroad, Chgo. | 1.55c |
| Track bolts, Pbgh. | 2.00c |
| Track bolts, Chgo. | 2.00c |

## SHAPES, PLATES AND BARS

| | |
|---|---|
| Structural shapes, Pittsburgh | 1.15c to 1.20c |
| Structural shapes, Chicago | 1.25c to 1.33c |
| Structural shapes, Philadelphia | 1.30c to 1.35c |
| Structural shapes, New York | 1.31c to 1.36c |
| Structural shapes, San Francisco | 2.00c to 2.05c |
| Tank plates, Chicago | 1.25c to 1.33c |
| Tank plates, Pittsburgh | 1.10c to 1.20c |
| Tank plates, Philadelphia | 1.30c to 1.35c |
| Tank plates, New York | 1.31c to 1.36c |
| Bars, soft steel, Pittsburgh | 1.15c to 1.20c |
| Bars, soft steel, Chicago | 1.25c to 1.33c |
| Bars, soft steel, Philadelphia | 1.30c to 1.35c |
| Bars, soft steel, New York | 1.31c to 1.36c |
| Hoops, carloads, Pittsburgh | 1.25c to 1.30c |
| Hoops, less carloads, Pittsburgh | 1.30c to 1.35c |
| Bands, Pittsburgh | 1.20c |
| Shafting, carloads, Pbgh., disc. contract | 66 |
| Shaft'g less carl'ds, Pbgh., disc. | 63 |
| Bar iron, Chicago | 1.00c to 1.05c |
| Bar iron, Philadelphia | 1.17c to 1.22c |
| Bar iron, New York | 1.15c to 1.20c |
| Bar iron, Cleveland | 1.20c |
| Bar iron, Pittsburgh | 1.20c |
| Hard steel bars, Chicago | 1.25c to 1.30c |
| Smooth finish. mchy. steel, Chi. | 1.68c |

## SHEETS AND TIN PLATE

| | |
|---|---|
| No. 28, black, Pittsburgh | 1.90c to 2.00c |
| No. 28, black, Chicago | 2.03c to 2.08c |
| No. 28, tin mill, black, Pbgh. | 1.95c |
| No. 28, galvanized, Pbgh. | 2.90c to 3.00c |
| No. 28, galvanized, Chgo. | 3.03c to 3.08c |
| No. 10, blue, annealed, Pbgh. | 1.40c to 1.45c |
| No. 10, blue, annealed, Phila. | 1.60c |
| Tin plate, 100 lb., coke, base | $3.30 to 3.50 |

## MISCELLANEOUS SHOP TOOLS

| | Discount. |
|---|---|
| Standard files | 80 and 5 |
| Heavy hammers, 3 to 5 lb. | 80 and 10 |
| Heavy hammers, over 5 lb. | 80 and 5 |
| Gas pliers, 7-inch per dozen | $2.00 |
| Gas pliers, 12-inch, per dozen | 3.50 |
| Cold chisels, per pound | 10c to 15c |
| Wrenches, aligator, discount | 75 to 80 |
| Wrenches, drop forged S. | 60 |

## EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

| | |
|---|---|
| Single pickled, cold roll., and re-an. | 30 cents |
| Hot roll'd, pickl'd and ann., tin mill | 25 cents |
| Full pickled, cold rolled and re-ann. | 50 cents |
| Auto sheets | 75 cents |
| Blued stove pipe stock | 10 cents |
| Range steel | 30 cents |
| Re-squaring | 10 cents |
| Roller levelling | 10 cents |
| Patent levelling and re-squaring | 35 cents |
| Oiling sheets | 10 cents |
| Deoxidizing | 10 cents |
| Lime finish | 10 cents |
| Open hearth steamping steel, free from mill scale | 55 cents |
| Special open hearth deep stpg. steel free from mill scale | 80 cents |
| Extra deep special auto body stock | $1.25 |
| Ext. for 28 gage ov. 32 to 36-in. wide | 10 cents |
| No reduction for sheets not annealed | |

The above extras apply on both sheet and tin mill specifications, at the same rate.

## IRON AND STEEL PIPE

(Pittsburgh.)

| | Black Butt-weld. | Galv. Butt-weld. |
|---|---|---|
| Steel, ⅛ to 3 inches | 80 | 71½ |
| Iron, ⅛ to 2½ inches | 70 | 61 |
| | Lap-weld. | |
| Steel, 2½ to 6 inches | 79 | 70½ |

## BOILER TUBES

| | |
|---|---|
| Steel, 3½ to 4½ inches | 73 |
| Iron, 3½ to 4½ inches | 60 |

## WIRE PRODUCTS

| | |
|---|---|
| Wire nails, jobbers, Pittsburgh | $1.60 |
| Wire nails, retailers, Pittsburgh | 1.65 |
| Plain wire, jobbers, Pittsburgh | 1.40 |
| Plain wire, retailers, Pittsburgh | 1.45 |
| Galvanized wire, jobbers, Pbgh. | 1.80 |
| Galvanized wire, retailers, Pbgh. | 1.85 |
| Polished staples, Pbgh. | 1.60 |
| Galvanized staples, Pbgh. | 2.00 |
| Barb wire, painted, jobbers, Pbgh. | 1.60 |
| Barb wire, painted, retail'rs, Pbgh. | 1.65 |
| Barb wire, galv., retail's, Pbgh. | 2.05 |
| Barb wire, galv., jobbers, Pbgh. | 2.00 |

## BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 20; cut threads 80 and 15; larger or longer, 75 and 15.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled, 80 and 25; cut, 80 and 20; larger or longer, 80.

Gimlet and cone point lag or coach screws, 80 and 25.

Hot pressed square, blank or tapped nuts, $6.30 off list; hot pressed hexagon blank or tapped, $7.20 off.

Cold pressed, c. and t. square, blank or tapped, $6 off; hexagon, blank or tapped, ½ inch and larger, $7.20; ⅜-inch and smaller, $7.80.

## RIVETS

| | |
|---|---|
| Structural rivets, Pbgh. | 1.45c to 1.50c |
| Structural rivets, Chgo. | 1.68c |
| Boiler rivets, Pbgh. | 1.55c to 1.60c |
| Boiler rivets, Chgo. | 1.78c |

## SCREWS

(New York.)

| | |
|---|---|
| Lag, gimlet and cone point | 80 and 20 |
| Coach, gimlet point | 80 |
| Standard Jack | 70 and 10 |
| Mch., cut thread, flat head | 50 and 10 |
| Mach., cut thread, round head | 50 and 10 and 10 |
| Mch., cut thread, fillister hd. | 40 and 40 and 10 |
| Mch. rolled thread, flat head or round head | 80 and 10 |
| Set screws, iron | 75 and 10 and 10 |
| Set screws, steel, per cent advance over iron | 25 |
| Square head cap screws | 70 and 10 and 10 |
| Hexagon head cap screws | 70 and 10 and 10 |
| Fillister head cap screws | 60 and 10 and 10 |
| Flat head wood screws | 10 and 10 and 5 |
| Round head wood screws | 10 and 10 and 5 |

## CAR WHEELS

| | |
|---|---|
| 33-inch engine truck wheels | $22.50 |
| 36-inch engine truck wheels | 23.50 |
| 33-inch tender wheels | 18.30 |
| 36-inch passenger train car and tender wheels | 21.50 |
| 33-inch freight car wheels | 15.50 |

All with standard 2½ inch rims and minimum standard hubs, usual extras applying for thicker rims and larger hubs; all f. o. b. cars, Pittsburgh.

# IRON AND STEEL PRICES

**Corrected up to Tuesday noon**

## STEEL SHEET PILING

(Pittsburgh.)

| | |
|---|---|
| Base sizes | 1.55c to 1.60c |

## TWISTED REINFORCING BARS

(Soft steel, Pittsburgh mill.)

| | |
|---|---|
| ¼-inch and larger | 1.25c |
| 5/16-inch | 1.30c |
| ½-inch | 1.35c |
| 9/16-inch | 1.50c |
| ¼-inch | 1.75c |

## TACKS

(New York.)

| | Discount. |
|---|---|
| American carpet tacks. | 90 and 20 and 10 and 10 |
| American cut tacks... | 90 and 20 and 10 and 10 |
| Railroad tacks | 90 and 50 and 10 |
| Gimp tacks | 90 and 20 and 10 and 10 |
| Finishing nails | 70 |

## WIRE ROPE

| | |
|---|---|
| Galvanized, iron and steel | 47½ and 2½ |
| Bright, iron and steel | 55 and 2½ |

## COLD ROLLED STRIP STEEL

(Subject to regular extras.)

| Base price Cut to length | | 0.10 to 0.19 Carbon |
|---|---|---|
| Hard. | Soft. | 1½ in. and wider. |
| 2.85 | 3.10 | 0.100 and thicker. |
| 2.95 | 3.20 | 0.050 to 0.099 inc. |
| 3.10 | 3.35 | 0.035 to 0.049 inc. |
| 3.35 | 3.75 | 0.031 to 0.034 inc. |
| 3.60 | 4.00 | 0.025 to 0.030 inc. |
| 3.80 | 4.20 | 0.020 to 0.024 inc. |
| 4.70 | 5.20 | 0.017 to 0.019 inc. |
| 5.10 | 5.60 | 0.015 and 0.016 |
| 5.95 | 6.45 | 0.013 and 0.014 |
| 6.55 | 7.05 | 0.012 |
| 6.90 | 7.40 | 0.011 |
| 7.25 | 7.75 | 0.010 |
| Coils | | |
| 2.75 | 3.00 | 0.100 and thicker |
| 2.80 | 3.05 | 0.050 to 0.099 inc. |
| 2.95 | 3.20 | 0.035 to 0.049 inc. |
| 3.10 | 3.50 | 0.031 to 0.034 inc. |
| 3.20 | 3.60 | 0.025 to 0.030 inc. |
| 3.30 | 3.70 | 0.020 to 0.024 inc. |
| 3.60 | 4.10 | 0.017 to 0.019 inc. |
| 4.00 | 4.50 | 0.015 and 0.016 |
| 4.70 | 5.20 | 0.013 and 0.014 |
| 5.05 | 5.55 | 0.012 |
| 5.40 | 5.90 | 0.011 |
| 5.75 | 6.25 | 0.010 |

## CAST IRON PIPE

| | |
|---|---|
| Three to 20 in., Cleveland | $21.50 |
| Twenty-four to 48-inch, Cleveland | 21.00 |
| Four-inch, water, Chicago | 26.00 |
| Six to 12 inches, Chicago | 24.00 |
| Larger sizes, Chicago | 23.50 |
| Six-inch, water, New York | 20.50 to 21.00 |
| Four-inch, water, Birmingham | 19.50 |
| Six-inch and larger, Birmingham | 19.50 |

Gas pipe, $1 per ton higher than water.

## WAREHOUSE PRICES

| | |
|---|---|
| Steel bars, Chicago | 1.65c |
| Steel bars, Cleveland | 1.80c |
| Steel bars, Cincinnati | 1.70c to 1.85c |
| Steel bars, Philadelphia | 1.70c to 1.75c |
| Steel bars, New York | 1.80c |
| Steel bars, St. Louis | 1.70c |
| Iron bars, Chicago | 1.65c |
| Iron bars, Cleveland | 1.75c |
| Iron bars, St. Louis | 1.65c |
| Iron bars, Cincinnati | 1.65c to 1.75c |
| Iron bars, Philadelphia | 1.70c |
| Iron bars, New York | 1.65c to 1.70c |
| Hoops, Chicago | 2.15c |
| Shapes and plates, Chicago | 1.75c |
| Shapes and plates, Cleveland | 1.90c |
| Shapes and plates, Cincinnati | 1.80c to 1.90c |
| Shapes and plates, St. Louis | 1.80c |
| Shapes and plates, Philadelphia | 1.70c to 1.75c |
| Shapes and plates, New York | 1.85c |
| No. 10 blue ann. sheets, Chgo. | 1.95c |
| No. 10 blue ann. sheets, Cleve. | 2.05c |
| No. 10 blue ann. sh., St. Louis | 2.00c |
| No. 10 blue ann. sheets, Cinci. | 1.95c |
| No. 28 black sheets, Chgo. | 2.55c |
| No. 28, black sheets, Cleveland | 2.45c |
| No. 28 black sheets, Cincinnati | 2.45c to 2.55c |
| No. 28 black sh., St. Louis | 2.55c |
| No. 28 galv. sheets, Chgo. | 3.55c |
| No. 28 galv. sheets, Cleveland | 3.35c |
| No. 28 galv. sheets, Cincinnati | 3.40c to 3.55c |
| No. 28 galv. sheets, St. Louis | 3.55c |

## TRIANGLE REINFORCING MESH

(Per 100 square f. o. b. mill, car loads.)

| | |
|---|---|
| No. 4, plain | $1.00 |
| No. 4, galvanized | 1.12 |
| No. 7, plain | .49 |
| No. 7, galvanized | .55 |
| No. 23, plain | 1.69 |
| No. 23, galvanized | 1.88 |
| No. 26, plain | 1.17 |
| No. 26, galvanized | 1.30 |
| No. 27, plain | .96 |
| No. 27, galvanized | 1.07 |
| No. 31, plain | 2.49 |
| No. 31, galvanized | 2.76 |
| No. 35, plain | 1.17 |
| No. 35, galvanized | 1.30 |
| No. 39, plain | 3.05 |
| No. 39, galvanized | 3.38 |
| No. 43, plain | 1.10 |
| No. 43, galvanized | 1.23 |

## Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—

| | |
|---|---|
| Baltimore | $1.80 |
| Buffalo | 1.85 |
| Chicago | 2.50 |
| Cleveland | 1.60 |
| Detroit | 2.10 |
| East St. Louis | 2.80 |
| Joliet | 2.50 |
| Louisville | 2.50 |
| Milwaukee | 2.70 |
| New York | 2.85 |
| Philadelphia | 2.05 |
| Pittsburgh | .75 |
| Richmond, Va. | 2.94 |
| Toledo | 1.85 |
| Valley Furnaces | 1.20 |
| Cincinnati | 2.00 |

## IRON AND STEEL SCRAP

(Net Tons.)

| | |
|---|---|
| No. 1 railroad wrought, Chgo. | $ 7.50 to 7.75 |
| No. 1 railroad wrought, Cleve. | 9.50 to 10.00 |
| No. 1 railroad wrought, St. L. | 7.25 to 7.50 |
| No. 1 railroad wrought, Cinci. | 8.00 to 8.50 |
| No. 2 railroad wrought, Chgo. | 7.25 to 7.50 |
| No. 2 railroad wrought, St. L. | 7.00 to 7.25 |
| Arch bars and transoms, Chgo. | 11.00 to 11.50 |
| Arch bars and transoms, St. L. | 10.50 to 11 00 |
| Knuckles, coup. & spr'gs, Chgo. | 9.00 to 9.25 |
| Knuckles, coup. & spr'gs, St. L. | 8.25 to 8.50 |
| Shafting, Chicago | 11.50 to 12.00 |
| Shafting, St. Louis | 12.50 to 13.00 |
| Steel car axles, Chgo. | 10.50 to 11.00 |
| Steel car axles, St. Louis | 10.25 to 10.50 |
| Locomotive tires, Chicago | 9.00 to 9.50 |
| Locomotive tires, St. Louis | 8.25 to 8.75 |
| Cut forge, Chicago | 7.25 to 7.50 |
| Pipes and flues, Chicago | $ 5.75 to 6.00 |
| Pipes and flues, Cleveland | 7.25 to 7.75 |
| Pipes and flues, St. Louis | 5.25 to 5.50 |
| No. 1 cast, Chicago | 9.25 to 9.50 |
| No. 1 cast, Cleveland | 9.50 to 10.00 |
| No. 1 cast, Cincinnati | 8.50 to 9.00 |
| No. 1 cast, St. Louis | 9.00 to 9.50 |
| No. 1 busheling, Chicago | 6.50 to 6.75 |
| No. 1 busheling, Cleveland | 8.00 to 8.25 |
| No. 1 busheling, Cincinnati | 5.75 to 6.25 |
| No. 1 busheling, St. Louis | 6.75 to 7.00 |
| No. 2 busheling, Chicago | 5.25 to 5.75 |
| No. 1 boiler plate, cut Chgo. | 6.25 to 6.75 |
| No. 1 boiler plate, cut, Buffalo | 9.00 to 9.50 |
| No. 1 boiler plate, cut, St. L. | 5.50 to 6.00 |
| Boiler punchings, Chicago | 8.25 to 8.75 |
| Cast borings, Chicago | 4.75 to 5.00 |
| Cast borings, Cleveland | 5.50 to 6.00 |
| Cast borings, Cincinnati | 4.25 to 4.75 |
| Cast borings, St. Louis | 3.50 to 4.00 |
| Machine shop turnings, Chgo. | 4.50 to 4.75 |
| Machine shop turnings, Cleve. | 5.25 to 5.50 |
| Machine shop turnings, Cinci. | 4.25 to 4.75 |
| Machine shop turnings, St. L. | 4.00 to 4.50 |
| Malleable agl., Chicago | 7.75 to 8.25 |
| Malleable agricultural, St. Louis | 6.25 to 6.50 |
| Malleable, railroad, Chicago | 7.75 to 8.25 |
| Malleable, railroad, Cincinnati | 6.50 to 7.00 |
| Malleable, railroad, St. Louis | 6.25 to 6.50 |
| Angle bars, iron, Chgo. | 10.75 to 11.00 |
| Angle bars, iron, St. Louis | 9.50 to 10.00 |
| Angle bars, steel, Chgo. | 7.75 to 8.00 |
| Angle bars, stel, St. Louis | 8.75 to 9.00 |
| Stove plate, Chicago | 8.50 to 8.75 |
| Stove plate, Cleveland | 7.50 |
| Stove plate, Buffalo | 9.00 to 9.75 |
| Stove plate, Cincinnati | 6.50 to 7.00 |
| Stove plate, St. Louis | 8.25 to 8.75 |
| Bundled sheet, Cincinnati | 4.00 to 4.50 |
| Wrought iron pil'g plates, Clev. | 13.00 |

(Gross Tons.)

| | |
|---|---|
| Heavy melting steel, Pbgh. | $10.25 to 10.50 |
| Heavy melting steel, Buffalo | 10.00 to 10.50 |
| Heavy melting steel, Chicago | 8.50 to 9.00 |
| Heavy melting steel, Cleveland | 8.75 to 9.25 |
| Heavy melting steel, Cincinnati | 9.00 to 9.50 |
| H'vy melting steel, eastern Pa. | 9.50 |
| Heavy melting steel, New York | 7.50 to 7.75 |
| Heavy melting steel, St. Louis | 10.50 to 11.00 |
| Bundled sheet, Buffalo | 6.25 to 6.50 |
| Grate bars, Buffalo | 9.00 to 9.50 |
| Grate bars, New York | 6.50 to 7.00 |
| No. 1 railroad wr'ght, east. Pa. | 11 00 to 11.50 |
| No. 1 railroad wrought, Pbgh. | 10.25 to 10.50 |
| No. 1 R. R. wght., New York | 9.00 to 9.50 |
| No. 1 R. R. wrought, Buffalo | 10.00 to 10.50 |
| Shafting, New York | 12.00 to 12.50 |
| Pipes and flues, New York | 7.75 to 8.00 |
| Pipes and flues, eastern Pa. | 9.25 to 9.75 |
| Mch. shop turnings, New York | 5.50 to 6.00 |
| Machine shop turnings, Buffalo | 5.50 to 6.00 |
| Mch. shop turnings, Pbgh. | 7.85 to 8.00 |
| Mch. shop turnings, eastern Pa. | 7.75 to 8.00 |
| Cast borings, New York | 5.50 to 6.00 |
| Cast borings, eastern Pa. | 7.75 to 8.00 |
| Cast borings, Buffalo | 6.00 to 6.50 |
| Cast borings, Pittsburgh | 8.00 to 8.50 |
| Stove plate, (Jersey points)) | 8.25 to 8.75 |
| Stove plate, Pittsburgh | 9.00 |
| Stove plate, eastern Pa. | 8.00 to 8.50 |
| Shoveling steel, Chicago | 7.25 to 8.00 |
| Shoveling steel, St. Louis | 7.50 to 7.75 |
| Reroll'g rails, 5 ft. & ov., Pbgh. | 13.00 |
| Reroll. rails, 5 ft. & ov., Chgo. | 10.00 to 10.25 |
| Reroll. rails, 5 ft. & ov., Cleve. | 11.00 to 11.50 |
| Reroll. rails, 5 ft. & ov.. E. Pa. | 11.75 to 12.00 |
| Reroll. rails, 5 ft. & ov., St. L. | 10.00 to 10.25 |
| Steel rails, short, Chicago | 10.00 to 10.25 |
| Steel rails, short, Cleveland | 11.50 to 12.00 |
| Steel rails, short, St. Louis | 9.50 to 9.75 |
| Iron rails, Cleveland nom. | 11.75 to 12.00 |
| Iron rails, Cincinnati | 10.25 to 10.75 |
| Iron rails, eastern Pa. | 13.50 to 14.00 |
| Iron rails, St. Louis | 10.00 to 10.25 |
| Iron rails, Pittsburgh | 13.00 to 13.50 |
| Frogs, switches, guards. Chgo. | 8.75 to 9.25 |
| Frogs, switches & g'rds, St. L. | 9.25 to 9.50 |
| Car wheels, (iron), Pittsburgh | 11.50 to 11.75 |
| Car wheels, (steel), Pittsburgh | 12.75 to 13.00 |
| Car wheels, Chicago | 10.00 to 10.25 |
| Car wheels, eastern Pa. | 10.00 |
| Car wheels, Buffalo | 10.50 to 11.00 |
| Car wheels, (N. J. points) | 9.25 to 9.50 |
| Car wheels, St. Louis | 10.00 to 10.25 |
| Iron axles, Pittsburgh | 20.00 to 21.00 |
| Iron axles, Cincinnati | 19.00 to 20.00 |
| Iron axles, eastern Pa. | 18.50 to 19.00 |
| Iron axles, Buffalo | 19.00 to 19.50 |
| Iron axles, Chicago | 15.75 to 16.25 |
| Steel car axles, New York | 12.00 to 12.50 |
| Steel car axles, Buffalo | 12.00 to 12.50 |
| Steel car axles, Cleveland | 13.50 to 14.00 |
| Steel car axles, eastern Pa. | 13.50 to 14.00 |
| No. 1 busheling, Buffalo | 8.25 to 8.75 |
| No. 1 busheling, Pittsburgh | 9.00 |
| No. 2 busheling, Buffalo | 5.75 to 6.25 |
| Low phosphorus steel, Buffalo | 14.00 to 14.50 |
| Low phosphorus steel, Pbgh. | 14.00 to 14.50 |
| Low phos. steel, eastern Pa. | 13.50 to 14.00 |
| No. 1 forge, eastern Pa. | 8.00 to 8.50 |
| No. 1 cast, eastern Pa. | 11.00 to 11.50 |
| No. 1 cast, Pittsburgh | 11.00 to 11.50 |
| No. 1 heavy cast (N. J. points) | 10.50 to 11.00 |
| Boiler plate, Cleveland | 8.50 to 9.00 |
| Mall. iron, agricul., Cleveland | 9.00 to 9.50 |
| Mall. iron R. R., Cleveland | 9.25 to 9.75 |
| Malleable, railroad, Pittsburgh | 9.50 to 10.00 |
| Mall. R. R., Buffalo | 9.25 to 9.75 |
| Mall., R. R. east. Pa. | 9.00 to 9.50 |
| Bundled sheet, Pittsburgh | 8.50 to 8.75 |
| Bundled sheet, Cleveland | 7.50 to 8.00 |

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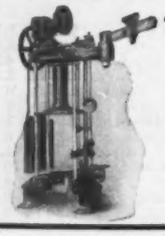

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## Using Turbines to Save Money

(*Continued from page* 810.)

turbo-blowers and exhausters in by-product coke oven work is a comparatively recent service and the Tennessee company was the first to install them in this country and probably the first anywhere to use them exclusively.

At the by-product plant at Fairfield there are five two-stage exhausters driven by three-stage high pressure turbines, each of 9,000,000 cubic feet capacity in twenty-four hours, that pull the gas from the batteries through the cooling apparatus and deliver the gas through the tar extractors to the saturators. Also at this plant there are two three-stage high pressure turbo-driven boosters, one of 24,000,000 cubic feet and one of 28,000,000 cubic feet capacity, one operating at a time, and delivering surplus gas through a 24-inch line to the Ensley steel plant.

With the usual type of apparatus a much larger by-product building and heavier foundations would have been required, and the experience of nearly three years' operation has justified the claim that this type of apparatus has a lower operating cost for labor, repairs and lubricants, as well as steam; and with the exception of trouble with shaft packing due to action of gas on the metal used originally, the installation has been successful in every way. There is a peculiar advantage in the use of turbo exhausters in by-product service in that the centrifugal action of the blower throws out the small particles of tar or tar fog carried with the gas, almost eliminating the work required of the tar extractors, which are located between the exhausters and the saturators. Three per cent of the total tar production of the plant is recovered from the drains on the turbo exhausters.

The speed and delivery of both boosters and exhausters is controlled by a float attached to the governor, the position of this float being determined by the suction pressure, so that the suction pressure is maintained practically constant although the delivery pressure, gas volume and speed are variable.

## Discussion by Alexander L. Hoerr

(*Continued from page* 810.)

most ideal, only two of the engines being reversing while four are connected to electric generators, giving on the whole a much more regular supply of steam and better opportunity for adjusting the turbine load than is usually obtained. The pressure curves from the low pressure steam system are the best evidence of satisfactory action, the sections given in the paper showing that the regenerator pressure at no time reaches the point at which the relief valve opens.

In the case of the low pressure turbine applied to a mill engine two different problems may be presented: First, the case of an existing mill with simple non-condensing engines and boilers in use, turbines and condenser to be purchased; second, the case of a proposed new mill, with boilers, engines, turbine and condenser, all to be purchased.

In the first problem, if the engine is of such type and in such condition as to indicate a considerable life for it, and if it is large enough to carry its load with some increase in back pressure, then a low pressure turbine and condenser will probably effect a greater saving than any other improvement that could be made, even though some steam is lost through the relief valve. This is true because the use of the existing equipment reduces the investment required and therefore the charges against the plant.

In the second problem, conditions are very different,

and in many cases will require the installation of different equipment to secure the maximum economy. In this case, if the proposed mill will furnish a reasonably steady load for the engine so that the supply of exhaust steam is regular, then the same solution may hold as for the first problem.

If, however, the more usual condition will prevail and the mill load will fluctuate rapidly through a wide range, sending the steam to the exhaust system in violent puffs, the same solution will not do. The turbo-generator in most cases will carry a load originating largely outside the mill which furnishes the steam. The changes in this load will not synchronize with the changes in the exhaust steam supply and although some peaks will be flattened out by the regenerators, there will be frequent loss of steam to the air.

In these problems the solutions adopted do not necessarily favor the combination having the highest thermal efficiency but the one producing the best plant economy. The point to be made is that after all it is not the combination having the highest heat efficiency that we want, but the one having the highest dollar efficiency. It is immaterial to the man who furnishes the money whether it be spent for coal; for material in repairs, such as iron, steel or brass; for oil; for labor; or for interest on investment. What he wants is the performance of a certain plant function for the minimum total expenditure, calculated for the probable life of the machinery performing this function.

Turbine-driven centrifugal pumps in the large sizes, operating under steam conditions such as obtain at steel mills, that is, saturated steam at not to exceed 165 pounds pressure, can be purchased with a guaranteed duty of approximately 120,000,000 foot pounds per 1,000 pounds of dry steam. With better steam conditions this can be increased . With such units available no plant with coal at $2 or less a ton can afford to install compound reciprocating pumps for general service without making a careful comparison of the total operating costs of both types.

*Changes in Machinery*

The adoption of the steam turbine as prime mover makes necessary a change in the machinery drive. The air tub gives way to the rotary blower, the plunger pump gives way to the centrifugal pump, and the large slow speed direct-current generator gives way to the compact high speed alternator. In the application to direct mill drive no change would ordinarily be made, but even here some few cases would permit the use of smaller diameter rolls at higher rotative speeds.

A great many turbine applications must be made through one or more gear reductions since the economical turbine speed is frequently above that of the driven machine. These gears have been a stumbling block in the path of the turbine in very many cases, the operating men questioning their reliability under mill conditions. These doubts have been quite generally dispelled by the successful operation of many installations in recent years. Satisfactory high speed gears are now made in all reasonable ratios and in all sizes, from that required for a boiler feed pump drive to that required for a mill drive.

To summarize the case of the turbine for mill use the writer would say that with the steam engine and gas engine it has a place as an economical prime mover. It is not the best prime mover for all purposes and the question of its use will often be decided by local operating conditions. Its adoption should never be based on a calculation which over-emphasizes thermal efficiency, since thermal efficiency is only one of many factors, the sum of which is a measure of plant economy and the object sought is the maximum value of this sum.

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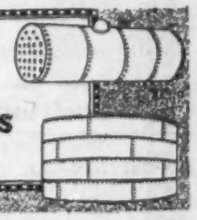

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